TIMBER RIGHTS
and
FOREST POLICY

In British Columbia

VOLUME 2

REPORT OF THE ROYAL COMMISSION ON FOREST RESOURCES
PETER H. PEARSE, COMMISSIONER

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LADNER DOWNS
Barristers & Solicitors
2100 Pacific Centre South
700 West Georgia Street
Vancouver, B.C. V7Y 1A8
Phone 687-5744

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APPENDIX A

EVOLUTION OF FOREST TENURE POLICY*

The principle of granting rights to harvest timber from Crown land, without alienating title to the land itself, was introduced in a Land Ordinance issued in 1865 by the Governor of the Crown Colony of Vancouver Island. This was one year before the colony united with the Colony of (mainland) British Columbia, and six years before British Columbia joined the Dominion of Canada as a province. Until then, rights to land and resources had been conveyed through outright grants; and while that method continued for several decades thereafter, retention of Crown ownership and provision only of rights to harvest the timber gradually became the cornerstone of the new province's forest policy. Because this policy was introduced at such an early stage, most of the forest land in British Columbia has been retained in public ownership, and responsibility for its management now rests almost entirely with the provincial Forest Service. This Appendix describes the evolution of the tenure arrangements which provide the main instruments for implementing the province's forest policy.

POLICY BEFORE 1912

Prior to 1912, rights to Crown timber were alienated through two means: outright grants of land, which included rights to the timber; and cutting rights over specified tracts of timberland maintained in Crown ownership. The latter took many forms which, together, comprise what we now call the old temporary tenures.

CROWN GRANTS

Initially forest land, like other classes of Crown land, was sold for settlement and the fee simple interest was granted without restriction on the right to cut timber. Early land policy was simply an adjunct to more general frontier policies aimed at encouraging settlement and promoting economic development, and the Crown grant procedure was consistent with the traditions of freehold ownership inherited from England. Timber conveyed under these grants was often of little interest to either the Crown or the grantee; indeed it was sometimes considered an obstacle to settlement and agricultural development. And even where the timber was valuable, until 1865 there was no other means for providing potential users with access to it.

A grant of land from the Crown confers the fee simple interest, entitling the landowner to exclusive possession and use of the land in perpetuity. It includes the right to cut and use any timber on the land unless special qualifications to the title provide otherwise. Early grants contained no limitations with regard to timber on the land.

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* Parts of this Appendix draw heavily on Task Force on Crown Timber Disposal, *Forest Tenures in British Columbia* (mimeo), Victoria, 1974, 126 pp. Historical sketches are also found in: *Fulton Report* (throughout); *Sloan Report 1945*, pp. Q86–Q98; *Sloan Report 1956*, pp. 16–192; and Robert E. Cail, *Land, Man and the Law*, University of British Columbia Press, Vancouver, 1974, pp. 91–110.

During this early period large tracts of timberlands were granted in aid of railway construction. Most of these have since reverted to the Crown, but a large transaction consummated between the Provincial and Dominion governments over 1883-84 has endured; some 1.9 million acres of particularly fine timber on Vancouver Island were granted to the Esquimalt and Nanaimo Railway Company. Still largely held in private hands, this land is the dominant example of the early Crown grant policy. About the same time some 14 million acres of provincial land on the mainland were granted in aid of transcontinental railway construction. These were held by the Dominion for almost 50 years before being returned to the Province in 1930.

Beginning in the 1880's, however, changes in Crown land policy gradually narrowed the scope for new grants of forested land. Restrictions were specified in the Land Act as early as 1884, and grants of "patented lands" during 1887 and 1888 reserved to the Crown the timber itself. To log these lands commercially the owners were required to obtain another authorization: a Special Timber Licence, one of the forms of old temporary tenures described below. This requirement still technically applies to these lands, although it evidently has not been enforced for decades. The policy of reserving the actual timber in the grant was short-lived, and in 1888 the policy was changed to include the timber with the grant, reserving to the Crown a financial interest in the harvest in the form of royalty. Sawtimber cut from lands granted between 1888 and 1914 has attracted a royalty of 50¢ per thousand board feet (or 30¢ per cunit) under the Crown grant documents then in use; through legislation this same levy has been applied to "patented lands" as well.

An amendment to the Land Act in 1887 prohibited grants of land "chiefly valuable for timber" but because of statutory ambiguities and administrative laxity grants continued to be readily available until 1896. Amendments introduced that year more explicitly defined the timberland which was to be reserved from sale, thus tightly circumscribing the government's power to alienate timber by means of Crown grants. By 1913 an estimated 2 million acres considered to be timberland were held in this form. Currently a relatively static 6.5 million acres, comprising 5 per cent of the forest land in the province, are privately owned. The increase over the years is attributable to new grants that escaped the statutory prohibition and to reclassification of lands granted before the turn of the century. In 1947 restrictions on the sale of timberland were extended to include forest land, defined as land best suited for forest production, whether timbered or not.

A second important limitation to timber rights on Crown grants was enacted on March 12, 1906, through the Timber Manufacture Act. Timber cut from lands granted from that day onward, as well as from all Crown lands, is required to be manufactured in the province, unless a Ministerial exemption is obtained. This export restriction has been an important feature of provincial forest policy ever since (see Chapter 22 and Appendix E).

Crown grants, because of their permanency and the wide scope of rights they convey, are undoubtedly the most secure form of forest tenure. However, the opportunities for government to influence land use and for the public to maintain an interest in forest land are correspondingly narrow. While the Crown grant was being gradually phased out, other forms of tenure—which maintained Crown ownership of the forest land base—were introduced, as alternative means of conveying access to public timber.

OLD TEMPORARY TENURES

The policy of granting rights to harvest timber without alientating the land, by means of Timber Leases, was first introduced through a 1865 Land Ordinance proclaimed in the Colony of Vancouver Island. Between then and 1907, when the provincial government suspended allocations and reserved all the remaining unalienated timber, a refinement of the lease and three additional forms of tenure evolved. A fifth, which was developed by the federal government during this time, eventually reverted to provincial control in 1930. This section outlines the roots of the various forms of these old temporary tenures.

Timber Leases. Records indicate that demand for the leases authorized under the 1865 Ordinance was light, but after the 1866 unification of the colonies a new Ordinance passed in 1870 empowered the Governor to grant rights to timber through Timber Leases which would be subject to whatever charges, terms, and conditions that he might prescribe. The Ordinances did not restrict the size of leases or their duration, nor did they impose any charges, but subsequent enactments and revisions imposed a variety of levies, terms, and conditions. Provincial legislation enacted in 1888 created a new form of lease; the lessee was obliged to pay both a royalty of 50¢ per thousand board feet and an annual rental of 10¢ per acre, and he was required to maintain a sawmill having a certain capacity. In return he was given the right to cut all timber on the lands specified in the lease, for a term not to exceed 30 years.

The rights conveyed by these leases, like those conveyed by all temporary tenures, were much more limited than the rights granted in a fee simple interest. In particular, they were of limited duration and the lessee's interest in the land was restricted to the designated purpose—to cutting and removing timber—and did not include the right to use the land for unrelated purposes.

Legislation passed in 1892 required all new leases to be granted by means of public auction (although there is some doubt whether this requirement was observed). At the same time, the maximum duration of new leases was limited to 21 years, and in 1895 the minimum rental was raised to 15¢ per acre. Finally, in 1901, holders of all leases issued under previous procedures were given the right to exchange their tenures for new 21-year leases which would be renewable for successive terms of 21 years. This opportunity was extended to the original 30-year leases as well, and afforded the government an opportunity to standardize the rental rates and royalties for all outstanding leases. For their part, lessees obtained rights which permitted them to defer cutting indefinitely, subject to payment of annual rentals. Most lessees opted for this scheme, and those who did not were later given another opportunity to elect to do so.

With minor modifications to these provisions Timber Leases were issued until 1905, by which time they covered over 350 thousand acres. Today 94 of these leases remain in good standing, having been renewed over the years. They vary considerably in size and their total acreage has shrunk by about two-thirds through successive eliminations of logged areas. (See Table 8-1, Chapter 8). Lessees are no longer required to maintain and operate sawmills. All Timber Leases carry terms of 21 years, and are next due to come up for renewal between 1985 and 1993.

Timber Licences. In addition to authorizing Timber Leases, which were designed to meet the needs of sawmilling, the legislation of 1888 anticipated the needs of independent loggers by creating the Timber Licence,[1] a modification of a general licence form which had been introduced in 1884. These licences were limited to one thousand acres in size and one year in duration, and carried annual rental and royalty obligations. They were renewable at the discretion of the Chief Commissioner of Lands and Works, but were not transferable. They remained largely the same until 1905 when new legislation radically altered their nature.

Licences issued after 1905 carried 1-year renewable terms as well, to a maximum 21 years. The legislation authorizing them also stipulated that the old licences already in force would be annually renewable for 16 years and, significantly, that all licences would be freely transferable. The transferability feature in this modified form of licence made it extremely popular: so much so that by 1907 it had become by far the most widespread form of harvesting rights. Over 15 thousand licences covering more than 9 million acres had been issued.

After the government had discontinued issuing old temporary tenures in 1907, licensees were given the option in 1910 of surrendering their licences in exchange for new annual licences which would be renewable indefinitely, as long as they contained merchantable timber. Today, the Timber Licence is still the most important form of old temporary tenure. While individually small, the 2,124 outstanding licences cover over one million acres.

Pulp Leases. In 1901 another instrument called a Pulp Lease was introduced specifically for pulp mills. These initially carried 21-year terms, but were later made renewable for successive and consecutive periods as long as they contained merchantable timber. They exacted a royalty of 25¢ per cord of pulpwood. The lessee was required to build a pulp mill with a capacity to manufacture one ton of pulp (or one and one-half tons of paper) per day for every square mile of Crown land leased. Thus, the Pulp Lease made it possible for industry to obtain rights to pulpwood on less onerous financial terms than those applicable to timber used for lumber production.

Any timber cut on a Pulp Lease not used for pulp was subject to the standard timber royalty of 50¢ per M fbm, thus precluding avoidance of the higher royalty. No Pulp Leases were approved after 1903, but in the two intervening years 354 thousand acres had been alienated. Today 33 Pulp Leases remain in good standing, having been renewed over the decades. They cover large areas, averaging over nine thousand acres each. All were most recently renewed in 1954 and were extended for one year in 1975. The original requirement that lessees maintain and operate an appurtenant pulp mill still applies under the present leases.

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[1] These tenures are variously described "Special Timber Licences" and "Timber Licences" in legislation, documents, and historical accounts. Hereinafter they are called Timber Licences.

Pulp Licences. Pulp Licences were originally Timber Licences, converted between 1919 and 1921 under special provisions that gave licensees who wanted to remove pulp timber the same advantages in terms of royalty and renewal fees that Pulp Leases offered over Timber Leases. This is the smallest category of old temporary tenures; there are now some 220 valid Pulp Licences, covering over 100 thousand acres.

Timber Berths. During 1883–84, in addition to the Esquimalt and Nanaimo Railway grant, the province granted the extensive Railway Belt on the mainland to the Dominion government to assist with the construction of the transcontinental railway. As part of its land settlement policy, the federal government issued forest tenures which, like their provincial counterparts, gave rights to cut timber without disturbing the Crown's title to the land. Known informally as Timber Berths, these licences carried royalty and rental obligations, and holders were obliged to operate sawmills. When the Railway Belt was returned to provincial ownership in 1930, the province agreed to honour the then outstanding Berths; ever since, the Forest Service has administered them in conjunction with provincial old temporary tenures. The 105 Timber Berths now outstanding carry renewable 1-year terms, and cover 164 thousand acres.

Besides these major tenure forms, several minor types of licences were issued in this period, the most important being Hand Loggers' Licences. These were used to provide timber to small logging enterprises that did not employ power machinery.

One other innovation deserves mention before subsequent developments are described. Legislation passed in 1901 required that, unless specifically exempted, all timber cut from Crown lands be manufactured in the province. The corresponding restriction on timber cut from Crown-granted lands alienated after 1906 has already been noted. These enactments, which were later supplemented by federal regulations, are the origin of the current provincial controls on exports of unmanufactured timber.

By 1907 vast tracts of Crown timberland had been covered by the old temporary tenures—the leases, licences, and berths described above. Although most of them have reverted to the Crown either because the timber was removed or because of default of payments, those that remain are still the most important manifestation of pre-1912 forest policy.

THE 1910 FULTON REPORT

In the couple of years preceding 1907, a variety of circumstances converged to produce a frenzy of "timber staking" in the province; the number of Timber Licences rose from less than 15 hundred to more than 15 thousand in three years. Although the government welcomed the rental revenues these rights produced, it was alarmed by the pace of events and the possibility that all the Crown timber in the province would become committed. In 1907, by an Order-in-Council, it therefore suspended further issuances of cutting rights, placing all the unallocated timberland under reserve. Before alienating any more timber, the government sought an assessment of its policy and to this end it appointed the first provincial Royal Commission of Inquiry into Forest Resources, under the Chairmanship of the Honourable F. J. Fulton.

In their 1910 report, the Commissioners estimated that roughly three-quarters of the province's merchantable timber had been alienated in one form or another. Their estimate, and other data, are reproduced in Table A-1. Based on the amount of timber it calculated had been alienated, the Commission was convinced that the forest industry's supply of timber was more than adequate for the foreseeable future. It thus emphatically endorsed the government's decision to reserve the remaining unalienated timber from disposition.

Table A-1

1910 FULTON REPORT ESTIMATES OF ALIENATED LAND AND TIMBER

tenure	acreage	average stand per acre	total stand
		fbm	
Vancouver Island Crown Grant Timber	318,000	35,000	11,130,000,000
Mainland Crown Grant Timber	552,000	say 10,000	5,520,000,000
E. & N. Ry. Co.	375,000	14,300	5,380,000,000
C.P.R., unpublished Timber Leaseholds	619,000	20,000	12,380,000,000
Special Licence Timber	9,000,000	12,000	108,000,000,000
Mill Timber on Pulp, etc., Leaseholds	387,000	at least 12,000	4,640,000,000
total	11,251,000 ac.	with a stand of	147,050,000,000
Reserved Timber Land, conjectured to be ¼ total forest area, under provincial jurisdiction, say roughly	3,750,000	say same as on licenses	45,000,000,000
total	15,001,000		192,050,000,000

Source: Fulton Report, p. D-17.

The Commission could foresee certain needs for further alienations, however. Efficiency required that fringes and corners of timber adjoining alienated tracts should be removed when the lease or licence was logged, and conservation considerations called for removal of fire damaged stands. In addition some localities where few old temporary tenures had been staked would require access to Crown timber. And the Commissioners were apprehensive that much of the timber already alienated might become concentrated in the hands of non-operating speculators, or that a combine of operating tenure-holders might restrict market competition.[2] It was thus for the purpose of maintaining market integrity, as well as providing for efficient harvesting, that the Fulton Commission recommended a procedure for alienating timber that was otherwise under reserve. The method suggested portended a new shift in forest tenure policy.

> Each berth, after exploration by the forest officers, should have its boundaries fixed by actual survey. The timber should be cruised and an upset price fixed per thousand feet for each important species. The license to cut timber on the berth should then be sold by public auction, the bids being the amounts per thousand feet that applicants would pay in addition to the royalty as when the timber is cut. A cash deposit of at least ten per cent (10%) of the total bonus he had offered should be made at once by the purchaser, as a guarantee that operations will be conducted in accordance with the regulations. The annual renewal of the license should be subject to the same rental per acre, and to the same conditions and penalties,

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[2] *Fulton Report,* p. D-55.

> as those imposed, by the provisions of the "Land Act" then in force, upon the special licensees of the Province.
>
> In all such sales it should be made a condition of the license that the timber should be removed within five years.
>
> In order to avoid loss to the Province, reserved timber damaged by fires should be sold by auction, in the manner described above, for removal within a three-year period. Areas to be sold should be divided into natural logging berths and also into square mile units. Alternative tenders should be required from each applicant.[3]

The gist of these recommendations was subsequently embodied in the Timber Sale Licence system.

POLICY FROM 1912 TO 1945

The recommendations of the *Fulton Report* were well received and many were adopted in the first Forest Act, passed in 1912.[4] As well as introducing new licensing arrangements, the Act made significant changes in administration. Until that time forest policy had been administered by the Department of Lands; the legislation created the Forest Service as a specialized agency within that Department to take charge of all forestry matters.

TIMBER SALE LICENCES

The most important feature of the new policy was that Crown timber would be available through Timber Sale Licences, incorporating the suggestions of the *Fulton Report*. The Act required that an area proposed for sale be surveyed and that its timber be "cruised and classified". Sales were preceded by advertising in the British Columbia Gazette for at least three months, and competitive bids were received by way of sealed tenders accompanied by a deposit of at least 10 per cent of the bid price. In addition to the standard rental and royalty, a successful applicant was obliged to pay to the Crown the appraised upset price determined by the Forest Service and any bonus he bid above the upset price, as well as the costs of advertising, cruising, and surveying.

The Timber Sale Licence system grew in importance in the years following 1912 because it was the only means available for disposing of new rights to Crown timber (other than Hand Loggers' Licences). Its use extended well beyond the special circumstances foreseen by the Fulton Commission, becoming a major device for serving the needs of an expanding forest industry. Until sustained yield policies were introduced in 1948 the Forest Service processed Timber Sale Licences almost without restriction in response to applications, and this form of tenure in its various forms has since become the most important means of conveying rights to Crown timber.

FOREST RESERVES

The 1912 legislation contained a number of other important provisions, one of which was a mechanism for establishing provincial Forest Reserves by Orders-in-Council. Once Crown land was given this designation, it could not be alienated for any non-forestry purpose unless it was first taken out of reserve by Cabinet order. Prior to this only the vagaries of the land classification system administered by Department of Lands officials protected Crown forest land from diversion to other uses. This new legislation authorized the Cabinet to reserve land for forest uses on the basis of examination and delineation by the Forest Service. This legislation is still in force and today there are 94 provincial Forest Reserves covering 75 million acres, some 60 per cent of the forest land in the province.

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[3] *Loc. cit.*

[4] S.B.C. 1912, c. 17.

FINANCIAL POLICIES

This first Forest Act also made a significant modification to the export restriction policy, in the form of a financial incentive. A tax was payable to the Crown on all timber cut, however all but a nominal amount was rebated on timber manufactured or used in the province. It thus effectively imposed an export tax. In 1930 the courts declared that it was not within the jurisdiction of the province to impose a tax of this sort, so it was no longer levied after that decision.

Since 1888, when the Land Act had imposed a fixed royalty of 50¢ per thousand board feet, that rate had remained unchanged, applying equally to "patented lands", lands granted after 1888, and the old temporary tenures. However, the Timber Royalty Act of 1914 attempted to establish a more discriminating royalty system.[5] To this end it prescribed a royalty applicable to all Crown lands (including the old temporary tenures) and Crown grants after 1914, which was to vary with species, grade, and region. In addition, provision was made for changing the rate every five years in accordance with a scale based on the selling price of lumber. While this was an ambitious attempt to determine the financial return to the Crown with reference to regional considerations and the varying values of the different species, the scheme failed because it tied royalty to market prices without reference to changes in logging and milling costs. Thus, when both prices and costs rose following World War I, the royalty rates increased substantially, even though the spread between revenues and costs had not. During the inflationary 1920's, strenuous objections from the industry led to a reassessment; this method for determining royalty rates was abandoned, and the Timber Royalty Act was repealed. A revised royalty schedule was established by a new Royalty Act, later incorporated into the Forest Act, and revised periodically (most recently in 1968). Today this statutory royalty schedule still applies to timber cut from lands granted since 1914 and from the old temporary tenures, while the 50¢ royalty rate is levied on timber cut from lands granted between 1887 and 1914.

PULPWOOD TENURES

The other major policy innovations during this era relate to two forms of rights for pulp timber. One was the Pulp Licences which, as already explained, were issued between 1919 and 1921 to pulp companies in exchange for Timber Licences. The other was the introduction of Pulpwood Timber Sale Licences, a modified form of the Timber Sale Licence authorized under the 1912 Forest Act. These were designed to attract and encourage investments in pulp and paper manufacture and to facilitate the use of timber best suited for pulping in existing or proposed pulp mills. They could be issued at the Minister's discretion to applicants who had spent at least $350 thousand in pulp mill development or who had posted a $50 thousand bond against future pulp mill construction. Pulpwood Timber Sale Licences could be very large—sufficient to provide up to a 5-year wood supply for the appurtenant mill. The rental charge was one-half that of ordinary sales, but could be revised upward to the extent that timber from the licensed area was processed into lumber instead of pulp.

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[5] S.B.C. 1914, c. 76.

Today, there are about 20 Pulpwood Timber Sale Licences in force, covering some 45 thousand acres and carrying terms of 3 to 12 years. Many of these were issued pursuant to Pulpwood Harvesting Area Agreements (described below) and none have been issued since 1971. This tenure has become largely redundant as new licensing arrangements have been developed.

SUSTAINED YIELD POLICIES AFTER 1945

By 1943, apprehensions had arisen over the unbalanced pattern of timber harvesting and inadequate provisions for future forest crops. Most timber was still being cut on Crown-granted land and old temporary tenures, concentrated in the best stands and in accessible parts of the lower Coast. Timber Sale Licences were growing in importance, but they too were generally clustered around more developed areas. Thus, while extensive regions of mature and over-mature timber were untouched, heavy and unregulated harvesting in certain areas was perceived to threaten exhaustion of local resources. Apart from the scant protection offered by Forest Reserves, there was little assurance of continuous forest production. In addition, the forest industry complained that the short-term Timber Sale Licence system was inadequate to provide the assurance of long-term raw material supply necessary for investment in new utilization plants. These and other general concerns about forest resource management led to the appointment of the second Royal Commission of Inquiry into forest policy, late in 1943.

The Commissioner, the Honourable G. McG. Sloan, in his 1945 report[6] dealt primarily with the design of a sustained yield forest policy for the province. He had concluded that the public interest required such a policy in order to gain maximum advantage from the province's forest resources, and to provide stability to the industry and communities which depended upon them. Forest land, he proposed, should be managed to produce timber in perpetuity.

To cope with the ambitious task of bringing the province's vast forests under this form of regulation, the Commissioner proposed creation of two types of sustained yield management units, which he referred to as "private working circles" and "public working circles".[7] The former involved a new licensing arrangement which would enable owners of Crown-granted land and old temporary tenures to combine their holdings with additional Crown land to form coherent management units, to be managed according to a sustained yield plan. They were intended to promote the orderly development and careful management of Crown and private forest land holdings, and to encourage industrial development and community stability by providing long-term supplies of timber for existing or proposed utilization plants. By delegating to the licensee direct responsibility for managing these units, the private resources of the industry would be mustered to the sustained yield effort, while supervision by the Forest Service would provide the necessary public safeguards.

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[6] *Sloan Report 1945.*

[7] *Sloan Report 1945*, pp. Q143–Q149.

The Crown forest lands that were not incorporated under these licensing arrangements should, the Commissioner proposed, be divided into "public working circles", each to be managed directly by the Forest Service as a sustained yield unit. The timber available for harvesting under the sustained yield plan would meet the needs of smaller and unintegrated enterprises.

The government incorporated most of these proposals in amendments to the Forest Act passed in 1947.[8] The Minister was given authority to grant Forest Management Licences, which would embody the "private working circle" proposal; the name was subsequently changed to Tree-farm Licence. In pursuit of the second major recommendation, the Forest Service proceeded to designate "public working circles", which eventually were renamed Public Sustained Yield Units.

The Commissioner's 1945 report had recommended that another Commission of Inquiry be struck ten years hence, to assess the government's progress in implementing the sustained yield policy. This advice was also accepted, and in 1955 the same Commissioner (who, shortly after completing his earlier inquiry was appointed Chief Justice of British Columbia) was designated to conduct the new review. His second report,[9] submitted in 1956, was considerably more voluminous than his first, although its recommendations were not nearly so far-reaching and were concerned mostly with administrative matters. The following pages trace the evolution of the sustained yield policy during the two decades following its explicit adoption in 1947, with special attention being paid to the tenure arrangements used to implement the policy.

TREE-FARM LICENCES

As an instrument of the new sustained yield policy the Tree-farm Licence tenure was appealing. Without relinquishing title or ultimate control over public lands, the government was able to bring under management private lands, old temporary tenures, and other Crown land, while assuring industrialists of the long-term timber supplies they required for investment in utilization facilities. Shortly after the new legislation was passed, the government began to receive scores of applications for the new form of tenure: by the end of the decade between the two Sloan Commissions, 23 had been awarded, 18 more had been given preliminary approval, and applications for a further 28 had been received.[10]

Applications submitted to the Minister were advertised, and sometimes public hearings were held, but the legislation gave unqualified discretion to the Minister to decide how many licences were to be issued, what size they would be, and which of competing applicants would be successful. Although the Crown lands committed under these licences would otherwise have been available for development under Timber Sale Licences, there was no provision for competition for these allocations. Because there were many conflicting applications and no clear criteria governed Ministerial discretion, awards sometimes generated a good deal of criticism from unsuccessful applicants as well as from the independent logging industry which was concerned about its narrowing opportunities to acquire harvesting rights.[11]

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[8] Forest Act Amendment Act, 1947, S.B.C. 1947, c. 38.

[9] *Sloan Report 1956.*

[10] *Ibid.*, pp. 102, 112 and 113.

However, in the decade following the *1956 Sloan Report* the government granted 20 more Tree-farm Licences, bringing the total to 43. Some have since been amalgamated, so the number now stands at 34. Their sizes and authorized cutting rates are summarized in Chapter 7, Table 7-1, and their locations are shown in Figure A-1.

The rights and obligations of the licensees and the Crown under the 34 Tree-farm Licences are defined partly in the contract documents themselves and partly in the Forest Act and Regulations. Many provisions are common to all licences while others vary, reflecting the special characteristics of different licence areas or differences in policy when the licences were issued or renewed. The following discussion is intended to reflect only the general nature of the Tree-farm Licences that have been issued to date, and it should be kept in mind that most contain unique provisions.

Composition of licences. Tree-farm Licences include lands of varying status, but all the lands in each licence are managed as an integrated sustained yield unit, under a single plan. The Crown-granted lands and old temporary tenures contributed by the licensee are designated as "Schedule A" lands in the licence document, while the additional Crown lands included are described as "Schedule B" lands. The contract describes the area covered by the licence, which is sometimes a single contiguous tract and sometimes several separate blocks. The location of licences and position of their boundaries are often influenced by licensees' prior holdings of "Schedule A" lands.

The proportions of "Schedule A" and "Schedule B" lands in Tree-farm Licences vary widely. The licensee is required to include among the former all his private forest lands or other timber rights held or subsequently acquired, that fall within the licence boundaries.[12] He nevertheless continues to be bound by most of the terms and statutory provisions relating to these Crown grants and old temporary tenures.[13] As the licensee removes the timber from his old temporary tenures those tenures are extinguished and the land is transferred to "Schedule B" lands. In addition, after the licensee has removed the timber from any of his Crown-granted parcels, he may elect to have them revert to the Crown and be transferred to "Schedule B" lands also; but whatever his choice, such lands remain subject to the sustained yield plan.[14] Under the contracts, the government retains some limited scope to withdraw "Schedule B" lands from the licence area, when they are required for other purposes (see Chapter 7).

Some Crown-granted lands included as "Schedule A" lands are classified as Taxation Tree Farms under the Taxation Act,[15] described in Appendix C. Thus the licensee can enjoy the property tax privileges accorded to Taxation Tree Farm land and also the contribution that these lands make to the annual allowable harvest of the Tree-farm Licence.

Term. The first 23 Tree-farm Licences (then Forest Management Licences) carried perpetual terms, cancellable only if the licensee failed to fulfill his obligations. In 1958, following recommendations in the second *Sloan Report*,[16] an amendment to the Forest Act limited the duration of all new licences to 21 years, renewable, subject to terms and conditions renegotiated on expiry in accordance with the Forest Act and Regulations.[17] From time to time since 1958, in connection with amalgamations and other amendments, the terms of many of the perpetual licences have been reduced to 21 years. Today, 18 Tree-farm Licences explicitly bear 21-year terms; the other 16 are among those which were originally granted in perpetuity, although (as explained in Chapter 7) there is some uncertainty about whether the 1958 amendment limiting terms to 21 years applies to these earlier licences as well. Table A-1 shows the distribution of expiry dates of current licences.

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[11] *Ibid.*, pp. 89–91.
[12] Forest Act, s. 36 (8), (9).
[13] *Ibid.*, s. 36 (10).
[14] *Ibid.*, ss. 36 (13), (13a).
[15] Ss. 38, 39. These are also referred to as "Certified Tree Farms".
[16] *Sloan Report 1956*, p. 96.

Table A-2

EXPIRY DATES OF CURRENT TREE-FARM LICENCES

year of expiry	number of licences
1979	4
1980	5
1981	1
1982	2
1987	1
1991	4
1992	1
"perpetual"	16
total	34

Source: B.C. Forest Service.

The Minister may cancel or suspend a licence if the licensee fails to comply with the terms and conditions set out in the Forest Act, the licence, or Cutting Permits issued pursuant to the licence. Until recently, licensees were entitled to appeal a cancellation to the British Columbia Supreme Court, and the Court of Appeal. Amendments to the Forest Act in 1974 replaced these arrangements with a right to appeal to the Cabinet.[18]

Management obligations. The forest management responsibilities of licensees are heavier under Tree-farm Licences than under any other form of tenure. To ensure proper management and harvesting according to sustained yield principles the licensee is required to submit management working plans for successive 5-year periods. These plans cover operations on all tenures within the licence, and include reforestation programmes, inventory data, allowable cut calculations, and general development priorities for the areas covered. They must be prepared by a Registered Professional Forester and approved by the Forest Service, and they govern all harvesting activities.

To harvest timber from any land in the licence area, including old temporary tenures and Crown grants, the licensee is obliged to obtain Cutting Permits from the Forest Service, authorizing short-term operations on prescribed tracts under detailed terms and conditions. Cutting Permits also contain directives concerning utilization standards, slash disposal, environmental protection, and so on.

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[17] Forest Act Amendment Act, 1958, S.B.C. 1958, c. 17, s. 4.
[18] Forest Amendment Act, 1974, S.B.C. 1974, c. 36, s. 9.

Harvesting by contractors. The so-called "contractor clause" was first introduced in 1953 to meet the growing anxiety of small logging operators as more timber became allocated under Tree-farm Licences. It commits the licensee to provide the opportunity to independent contractors to log a specific percentage of the harvest from "Schedule B" lands. The earliest licences contained no "contractor clause"; of these, seven remain. When the clause was first introduced, the fraction to be made available to contractors was set at 30 per cent, a rate which currently applies to nine Tree-farm Licences. In the 18 issued or amended more recently, 50 per cent usually has been prescribed.

Crown charges. On timber cut from Crown-granted lands and old temporary tenures within a Tree-farm Licence the licensee is obliged to pay the statutory royalty applicable to these tenures, described earlier. Like Timber Sale Licences, timber cut from "Schedule B" lands attracts stumpage charges appraised by the Forest Service. But unlike Timber Sale Licences, which provide (albeit narrow) opportunities for competitive bidding in excess of the appraised stumpage price, the "Schedule B" timber is immune from competition, and hence attracts only the upset price in all cases.

Originally, the licensee could choose one of two ways to pay stumpage on timber cut from these Crown lands. He could elect to pay full stumpage and have the costs of management, protection, and silvicultural treatment included as logging costs in the stumpage calculation, or he could choose to receive no reimbursement but pay only 16 per cent of the normal stumpage charge on timber cut after the end of the first rotation. In 1958, however, this latter choice, which only a few licensees had elected, was eliminated;[19] now all licensees pay full appraised stumpage and qualify for forestry cost allowances in the appraisal. Other levies applicable to Tree-farm Licences, including annual rentals, property taxes and forest protection tax are described in Chapter 13.

Appurtenancy and transferability. Most Tree-farm Licences are appurtenant to one or more timber manufacturing facilities—often integrated forest complexes. In these cases the prescribed manufacturing plant must be capable of utilizing a volume at least equal to the annual harvest issued under the licence, and must use the timber in that plant unless Ministerial approval to dispose of it otherwise is obtained.

Many licence documents provide that any appurtenant manufacturing facility may not be sold or transferred separately from the licence. In such cases ownership of the mill and the licence must continue to be vested in the same party. Licences not appurtenant to facilities may not be transferred without the consent of the Minister.[20]

PUBLIC SUSTAINED YIELD UNITS

Following the *1945 Sloan Report* the Forest Service began to undertake surveys and planning for "public working circles" over unencumbered Crown forest land. The first of these units was designated in the early 1950's, and within a decade much of the province's major available timber producing regions had been delineated into what became known as Public Sustained Yield Units, illustrated in Figure A-1.

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[19] Forest Act Amendment Act, 1958, *op. cit.*

[20] Forest Act, s. 36 (22).

To allocate timber rights in Public Sustained Yield Units the government simply adopted modified forms of the standard Timber Sale Licence. The Minister had wide statutory latitude in prescribing the terms and conditions of these licences, and they had already proven to be a highly versatile device, having assumed a variety of special forms such as Pulpwood Timber Sale Licences and licences for other special products. In 1950, this discretionary power was used to introduce long-term Timber Sale Licences with terms up to 30 years (although 15 years was most common), designed to provide licensees with sufficient continuity of timber supply to encourage them to construct costly road systems into remote areas. Relatively few long-term licences were granted, however, and for other Timber Sale Licences a term in the order of five years was normal.

The new Timber Sale Licence arrangements introduced with the establishment of Public Sustained Yield Units were directed toward two objectives: first, to restrict the rate at which new licences were issued; and second, to regulate the rate of harvesting under individual licences. These procedural and contractual innovations enabled the government to reconcile harvesting with the calculated sustainable yield in each unit. Transitional adjustments to the new regulated regime were eased by giving established operators preference in allocations of the available timber and these initial advantages were carried over to confer continuing advantages to these licensees. From these new policies and procedures the "quota" system emerged.

The "quota" system. Beginning in 1912, new dispositions of Crown timber took the form of Timber Sale Licences which were initiated by application, advertised, and sold to the highest bidder, subject to upset prices fixed by Forest Service appraisals. Before the sustained yield programme was introduced there were no limits on harvesting rates, so the Forest Service would routinely advertise and sell Timber Sale Licences as quickly as they were applied for.

Under the regulated harvesting introduced with the creation of Public Sustained Yield Units this passive response to applications could not continue, especially where harvesting already outstripped the estimated sustainable yield of the land. In such cases the Forest Service sought to minimize the necessary cut back and consequent disruption by including extensive undeveloped tracts with areas under heaviest harvesting pressure, when it drew unit boundaries. Nevertheless, in many of the new Public Sustained Yield Units it appeared to be necessary to reduce harvesting rates, and in all of them regulated management called for a harvesting limit.

The Forest Service experimented with and discarded two administrative techniques for solving this problem before finally settling on the present "quota" system. First, the "commitment review" system was tried in some of the original Public Sustained Yield Units. Applications for new Timber Sale Licences were accepted only from established operators within a Public Sustained Yield Unit; that is, only those who held Timber Sale Licences in the unit when the programme was introduced qualified to initiate new sales, and applications from anyone else were rejected. Priority was given to those with the shortest timber supplies. But because there was no regulation of the rate of harvesting during the term of licences, this system favoured licensees who cut the fastest. This system was therefore abandoned in favour of the second approach, the "licensee priority system".

The "licensee priority system" shifted the basis of eligibility for new rights to the annual volume harvested by licensees when the system was introduced. The cruised volume for each licence then in effect was divided by its term, to yield an average annual rate of cut. As each licence expired the Forest Service would accept an application from the established licensee for a replacement licence which would authorize a corresponding average harvest over its term. Cut controls were introduced to ensure that the total harvest authorized by each licence would be spread more or less evenly over its duration. Again, applications from outsiders were rejected, as were those from established operators for timber in excess of the volumes for which they were eligible under this arrangement.

The "licensee priority system" proved awkward, because it was difficult to match exactly (or even by multiples) the cruise volumes in successive sales. Moreover, by calculating them for each licence individually, cut controls were unnecessarily confining. Accordingly this approach was abandoned in favour of the "quota" system, which combined all of the Timber Sale Licences held by each licensee in each Public Sustained Yield Unit into a single volume commitment for cut control purposes. Thus any deficiency in the operator's annual cut under one of his licences could be made up by a surplus in another. This aggregate volume was often held under several licences, and it became known as the licensee's "quota position" in the unit.

When this system was introduced in new Public Sustained Yield Units the "quota" volumes were apportioned out among the established operators according to a formula, which took into account three aspects of each licensee's performance over the previous 3-year period: his average authorized volume, his average actual cut, and his average mill production (use of mill production was later discontinued as it involved double counting production by licensees without mills). Each licensee qualified for a "quota" allocation equal to the greatest of these, except where the total for all established operators exceeded the allowable annual cut for the unit. That problem was resolved by proportionately reducing the allocation of all licensees. In this manner the allowable harvest was apportioned among established operators; each qualified for a percentage which was translated into an annual volume commitment. As with the other two systems, outsiders did not qualify to apply for Timber Sale Licences in the unit, and applications from established operators were limited to new sales designed to replace those expiring. For some years, Timber Sale Licences retained the traditional feature of conferring rights over surveyed areas.

Special bidding procedures. While the Forest Service was reconciling cutting rates with sustainable yields through experimentation with the "commitment review", "licensee priority" and "quota" allocation systems, other procedural developments were being implemented which had the effect of restricting the scope for competition for Timber Sale Licences. Prior to 1960 only established licensees were allowed the privilege of applying for new licences, but bidding on the sales was unrestricted, so that outsiders and other established operators alike were eligible to compete.

Beginning with a 1960 amendment to the Forest Act[21] the scope for competitive bidding was gradually narrowed. Under that provision the established operators in seriously overcommitted units were offered a special bidding privilege. As the officially recognized applicant an established operator was permitted to elect that all bids be submitted to the Forest Service in the form of sealed tenders, instead of by means of oral bids at a public auction which had been in use since 1921. More important, the established operator was given the right to match any sealed tender bid higher than his own and thereby be awarded the sale. In 1961 these privileges were extended to established operators in Public Sustained Yield Units that were not overcommitted but merely fully committed.[22]

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[21] Forest Act Amendment Act 1960, S.B.C. 1960, c. 16, s. 3.

Additional bidding protection came in 1964 through another statutory amendment which required all bidders for a sale, except the "quota" holder, to submit a bidding fee to the Crown.[23] Set at 50¢ per cunit of harvest authorized under the prospective licence, the fee is forfeited to the Crown whether the competitor is awarded the sale or not (if, for example, the established operator matches his bid or someone else outbids him).

The combination of the sealed tender option, the matching bid privilege and the forfeitable bidding fee soon discouraged competition to the point where it now rarely, if ever, occurs; and established operators can maintain their "quota positions" by replacing expiring Timber Sale Licences with fresh ones with relative ease. The competitive timber sale policy that had been followed for 50 years since the *Fulton Report* of 1910 had been all but totally undermined by 1964. As is evident from Table A-3, the "quota" system governs over half of the timber sold in the Public Sustained Yield Units, although its significance varies widely from region to region.

Table A-3

"QUOTA" VOLUMES AND TOTAL COMMITMENTS IN PUBLIC SUSTAINED YIELD UNITS, BY FOREST DISTRICT[1]

Forest District	total volumes committed in Public Sustained Yield Units[2]	volumes held under "quota"	*proportion of total commitments held under "quota"*
	thousands of cunits		*per cent*
Vancouver	2,286	2,212	*97*
Prince Rupert	2,111	1,293	*61*
Prince George	4,197	1,315	*31*
Cariboo	1,855	870	*47*
Kamloops	2,226	1,191	*54*
Nelson	1,502	888	*59*
	14,177	7,769	*55*

[1] As of July, 1975.
[2] Includes all rights held under Timber Sale Licences and Timber Sale Harvesting Licences.
Source: B.C. Forest Service.

OTHER SUSTAINED YIELD UNITS

Besides the Tree-Farm Licences and Public Sustained Yield Units two other, generally smaller, types of sustained yield units evolved after the 1946 Royal Commission report. Farm Wood-lot Licences were designed to serve the special needs of farmers, and Taxation Tree Farms offered owners of Crown-granted forest land tax incentives to practise sustained yield forestry.

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[22] Forest Act Amendment Act 1961, S.B.C. 1961, c. 20, s. 2.
[23] Forest Act Amendment Act 1964, S.B.C. 1964, c. 21, s. 2.

Farm Wood-lot Licences. An amendment to the Forest Act passed in 1948[24] authorized the Minister to grant to *bona fide* farmers the timber rights over small areas of Crown forest land: the lesser of 640 acres, or sufficient land to yield 100 cunits in annual timber production. Any private forest land owned by the farmer would be combined with the Crown acreage into a sustained yield Wood-lot, and would proportionately reduce his eligibility for Crown land.

The response to this programme has been spotty over the years. Presently 36 Wood-lots are outstanding, covering 10 thousand acres of productive forest land. Actual production from these units is negligible in the provincial context.

Taxation Tree Farms. A 1951 amendment to the Taxation Act,[25] which imposes property taxes on private lands outside municipal boundaries, provided tax relief for owners of Crown-granted land who agreed to practise sustained yield forestry according to plans approved by the Forest Service. Taxation Tree Farms are comprised wholly of private holdings and the special tax provisions that apply under this arrangement are described in Appendix C.

In 1976, 48 Taxation Tree Farms were operating under approved management plans. Many of these are owned by Tree-farm Licensees and 17 are included within Tree-farm Licence boundaries and managed as integral parts of the relevant Tree-farm Licence.

RECENT DEVELOPMENTS

By the mid-1960's the sustained yield programme proposed by the second Royal Commission had taken firm root in the form of Tree-farm Licences and Public Sustained Yield Units, and to a lesser degree as Farm Wood-lots and Taxation Tree Farms. The third Commission report, released in 1956, reviewed the government's progress over the intervening decade and made a number of suggestions for improvement. These recommendations were aimed chiefly at tightening administrative arrangements and, with a few exceptions, did not herald major shifts in policy.

The dramatic industrial developments since the early 1960's have led the government to introduce new policy innovations, but without the advice of Royal Commissions. Most significant have been new arrangements to accommodate the pulp industry in the Interior, certain adjustments to the old temporary tenures, and the recommendations of the Task Force on Crown Timber Disposal.

PULPWOOD HARVESTING AREA AGREEMENTS

Until the early 1960's, pulp manufacturing was confined to the Coast. In 1955 a Tree-farm Licence was issued in the south-eastern part of the province to supply the first Interior venture—an integrated pulp and lumber complex at Castlegar—which began production in 1961. It was evident that the forests of other parts of the Interior were well suited to pulp production as well, but a vigorous and well established sawmill industry had largely pre-empted most of the available harvest from the Public Sustained Yield Units, under "quota" arrangements. Pulpwood Harvesting Area Agreements were conceived to make available to new pulp ventures the small and decadent timber that was then considered unsuitable for sawmilling. This would leave the sawtimber "quota" allocations intact, superimposing a complementary pulp industry over the established sawmilling sector.

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[24] Forest Act Amendment Act, 1948, S.B.C. 1948, c. 25, s. 4.

[25] Taxation Act Amendment Act, 1951, S.B.C. 1951, c. 81, s. 8.

Through an amendment to the Forest Act in 1961,[26] the Minister was given authority to designate any Interior Public Sustained Yield Units as Pulpwood Harvesting Areas, and to grant options to harvest the pulpwood in those areas. The first of these Pulpwood Harvesting Area Agreements was consummated in 1962 to guarantee a wood supply for a pulp mill proposed for the Prince George area. By 1967, four others had been executed to accommodate new pulp mills at Kamloops, Quesnel, and Prince George; a sixth was issued but later cancelled when its holder failed to proceed with construction of a pulp mill.

The Minister was given fairly wide discretion under the legislation to designate Public Sustained Yield Units as Pulpwood Harvesting Areas, and to grant options to harvest the pulpwood within them. Each of the existing Areas is comprised of several Public Sustained Yield Units. The Act requires allocation by competitive bidding where two or more parties show an interest in acquiring an option over a designated Area, but all of the existing agreements were issued without competitive bidding. Bids were received for one agreement proposed for the Kootenay region but the sale was eventually withdrawn by the Minister. All of the agreements currently in force carry the maximum 21-year term authorized by statute. Upon expiry they are renewable, subject to renegotiation of their terms and conditions.

The central feature of these agreements is the option they confer to harvest pulpwood[27] in the designated Area. Their holders are under no obligation to harvest timber, but they may call on the government to issue Timber Sale Licences authorizing cutting up to a maximum annual volume. Four of the agreements specify this volume in cunits, while the fifth leaves it to the determination of the pulp company. In addition to these annual rates of cut, four of the agreements confer options over a specified total volume of timber that may be harvested in the Prince George Special Sale Area—a large area of unregulated Crown forest land in the central Cariboo—at any time during the life of the agreement. Any timber cut—whether under the annual Public Sustained Yield Unit allotments or from the Special Sale Area—attracts stumpage fixed at low pulpwood rates.

As well as obtaining these options to cut Crown timber, holders of these agreements accepted important contractual obligations designed to harmonize their presence with the existing sawmill industry. They undertook to build and operate a pulp mill of a prescribed capacity, and to purchase sawmill residues produced "in and about" the Pulpwood Harvesting Area, creating a ready market for chips produced as a by-product of lumber and an incentive for sawmills to install the necessary barking and chipping facilities. Together with certain aspects of the "close utilization" policy discussed below, this encouragement soon generated chips in sufficient quantities to supply the entire requirements of the pulp mills. Only to a minor extent have the pulp companies called on their options to cut standing timber, and only two of the five mills are equipped to utilize roundwood.

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[26] Forest Act Amendment Act, 1961, S.B.C. 1961, c. 20, s. 3. The relevant statutory provisions are now set out in s. 17A of the Forest Act.

[27] Difficulties with interpreting this term are discussed in Chapter 9; generally it refers to Crown timber unsuitable for sawmilling.

Initially, all but one of the agreements prohibited their holders from competing for rights to sawtimber in the relevant Pulpwood Harvesting Areas. This effort to discourage integration was intended to avoid dislocating the established sawmilling industry by preventing pulp companies from competing for its timber supplies. This prohibition has not prevented integration, however: one agreement omitted it entirely because its holder was previously engaged in sawmilling; it was deleted by an amendment to a second agreement; and in any event it does not extend to subsidiaries, affiliates, and partners of the pulp companies. Through acquisition of existing firms and establishment of new affiliated sawmill concerns, all of the pulp companies have built up substantial sawmilling interests in their Areas.

"CLOSE UTILIZATION" AND "THIRD BAND" LICENCES

Originally, the regulated harvest in Public Sustained Yield Units, "quotas", and the cutting rates allowed under Tree-farm Licences were all calculated to "intermediate utilization" standards, which prescribed removal of all timber which was then considered suitable for manufacturing lumber. But as logging and manufacturing technology developed, and as the pulp industry expanded in the Interior in the 1960's, the Forest Service encouraged adoption of the more intensive "close utilization" standard,[28] which involved removal of smaller trees, more of the stumps and tops, and more defective pieces. New sawmilling technology had enabled utilization of this material, and the government offered incentives to lumber producers to install the needed facilities, especially the barking and chipping equipment required to manufacture by-product chips. In result, the new standard was adopted throughout most of the Interior and to a large extent on the Coast as well.

When timber inventories and allowable harvests were recalculated to the "close utilization" standard they were inevitably larger, and in Public Sustained Yield Units containing much small and defective timber, often more than twice as large. Thus, the revised annual rate of cutting that could be maintained according to the Forest Service's sustained yield criteria was considerably higher than that committed under "quotas", based on the "intermediate utilization" standard.

In 1966 the government offered a strong incentive for adoption of the closer standard, and at the same time allocated much of the additional harvest that consequently became available. "Quota positions" of licensees who elected to log to "close utilization" standards were automatically increased by one-third. Later, in 1972, this was increased further to one-half on the Coast. This extra cut was not, therefore, allocated through competitive bidding but was directly distributed by the Forest Service to the established licensees, in proportion to their "quota positions".

This incentive allocation was thus capable of increasing harvesting by one-third in Interior Public Sustained Yield Units and by one-half in coastal units. Yet this was typically insufficient to absorb all the extra allowable cut that became available with the recalculations based on "close utilization" recovery standards, especially in many Interior units containing high proportions of small or decadent timber. This extra allowable annual cut—called "third band" volume—was not distributed through automatic "quota" increases, but was temporarily withheld for two purposes: first, to ensure that the sawmills were capable of utilizing the lower quality wood included in the "close utilization" inventory; and second, to hold in reserve the volumes allocated to Interior pulp mills under their Pulpwood Harvesting Area Agreements. However it soon became evident that sawmill technology was adequate, and that the Interior pulp mills could be sustained by residual chips produced by sawmills. These circumstances obviated the need for withholding the additional volumes, so the Forest Service developed the "third band" Timber Sale Licence as a means for allocating them.

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[28] Definitions of these expressions are set out in the Glossary.

The initial distribution of "third band" volumes was accomplished in two waves. First, the additional cut, excepting the pulpwood volumes held in reserve in the Pulpwood Harvesting Areas, was released in 1969. Then in 1972 the pulpwood reserves were allocated as well. As a matter of policy the Forest Service distributed "third band" volumes only if at least 80 per cent of the current harvest from the relevant Public Sustained Yield Unit was then being logged to the "close utilization" standard.

"Quota" bidding privileges were not invoked (except for a few so-called "locked-in third band" sales), but other arrangements substantially restricted the scope for competitive bidding. Eligibility was confined to the established "quota" holders in the Public Sustained Yield Unit who (i) had installed barking and chipping equipment, and (ii) were able to demonstrate a "need" for the volumes to maintain their mills at a stipulated rate of production (440 shifts per year for sawmills, and 660 shifts per year for pulpwood and veneer plants). Once these "needs" were met, applications were considered from established operators in other units who could meet the same criteria. Finally, after the established operators had thus been provided for, the "needs" of other mills which did not hold "quota positions" were considered in 1972 when the pulpwood reserves were released. Logging concerns that held "quota positions" but did not operate milling facilities were considered eligible if they had first agreed to sell the timber to a mill having barking and chipping facilities.

Before "third band" licences were issued in Pulpwood Harvesting Areas, applicants operating mills were required to agree to sell their chips to the pulp company holding the Pulpwood Harvesting Area Agreement. The licences directed their holders to offer to the relevant pulp mill, the chips produced, and empowered the Minister to revoke the rights on a year's notice if the pulp mill had a need for roundwood timber supplies. By letter the Minister assured the pulp companies that he would direct chips in this manner, and revoke "third band" sales, if necessary to meet the pulp mill's needs. Similar arrangements were adopted in certain Public Sustained Yield Units in the East Kootenay, although they were not designated a Pulpwood Harvesting Area.

Although the "third band" policy was an adjunct to the broad "close utilization" developments begun in 1966, it was not until 1969 that this form of Timber Sale Licence was adopted. In the meantime the Timber Sale Harvesting Licence had been introduced, which granted rights to annual volumes of Crown timber (rather than rights to the timber on specific areas) and delegated certain additional responsibilities to licensees. These innvoations, which are described fully below, were applied to most "third band" licences as well.

The first "third band" Timber Sale Licences carried terms up to three years. By 1972 the bulk of those that had been issued were due to expire, and the Forest Service undertook a comprehensive study to assess licensees' performance over the relevant terms of their licences before renewing them. This investigation had Forest Service personnel conducting a detailed examination of the scale and production records of each mill using "third band" timber, to ascertain the average volume processed for each operating shift at each mill, and to determine the extent to which the operator could demonstrate a continuing "need" for the allocation. This performance review could not be completed until the three-year period, allowed to demonstrate performance capability, had expired for all licensees. To avoid a hiatus in operations those licences which had expired were renewed for one year, pending completion of the review. More recent licences have usually carried terms between three and five years.

Because Interior "quota" increases amounted to only one-third, and because of the abundance of small diameter and decadent timber in that part of the province, "third band" sales are much more significant in the Interior than on the Coast. In 1975 they accounted for over half the harvest in some Interior regions, while on the Coast, with its larger timber and larger "quota" increases, their contribution was almost negligible (see Table 6-1).

REVISIONS IN TREE-FARM LICENCES

As these developments were taking place in the Public Sustained Yield Units, parallel but rather less complicated changes were adopted for the Tree-farm Licences. Holders of these tenures also made the shift from "intermediate" to "close utilization" standards, substantially increasing the annual cutting rates approved under management working plans.

In Tree-farm Licences, the licensee is entitled to the entire approved sustained yield harvest in the licence area, so there was no need for policy to allocate the additional cut among competing users as was done in Public Sustained Yield Units. Each licensee fell heir automatically to all of the additional harvest indicated when "close utilization" recovery standards were adopted for his unit. This contributed substantially to the increases in approved annual cutting rates for Tree-farm Licences of up to 500 per cent (see Table 7-1).

TIMBER SALE HARVESTING LICENCES

The Timber Sale Licence that had sprung directly from the recommendations of the *Fulton Report* of 1910 traditionally conveyed a right to cut all the timber in a specific geographical area. With the designation of the Public Sustained Yield Units and the imposition of cutting constraints this attribute was retained and harvesting rates were regulated by means of cut control conditions stipulated in the licences, which collectively comprised the "quota position" of the licensee. Any deficiency or excess in the volume of timber estimated to be in the licence area was corrected by curtailing or extending licence terms.

In 1967 a new variety of the traditional Timber Sale Licence, the Timber Sale Harvesting Licence, was introduced which eliminated the awkward task of reconciling volume allocations with the inventory of licensed areas. These licences do not confer a right to the timber on a specific area, but rather a right to harvest an annual volume in a designated Public Sustained Yield Unit over the term of the licence, which is typically ten years. Thus, beyond describing the management unit, the licence is not area-specific, and the particular areas to be harvested are defined by the Forest Service in Cutting Permits issued during the life of the licence. However, the general area in the Public Sustained Yield Unit where the licensee is expected to exercise his cutting rights is designated informally as his "chart area".

"Quota" holders in all Public Sustained Yield Units were invited to surrender their Timber Sale Licences for this new variant, consolidating all of their "quota" volume in the unit under a single Timber Sale Harvesting Licence. Licensees responded quickly and positively to this invitation, so that the new tenure rapidly replaced most of the old timber sales (see Table 6-1). In addition to the switch from area-based to volume-based rights, this form of agreement incorporated other innovations as well: most important, longer terms and increased management responsibilities.

The broad purpose of this form of tenure was explained to be to ". . . permit the operator to play a larger role in the management of the public sustained-yield unit and at the same time, provide him with as much flexibility as possible".[29] The new tenures enabled licensees to consolidate operations previously scattered among several short-term Timber Sale Licences in a Public Sustained Yield Unit, and to plan their harvesting to meet their mill requirements over a longer period.

Under Timber Sale Harvesting Licences, upset stumpage is appraised by the Forest Service as individual Cutting Permits are issued and the other levies applicable to ordinary Timber Sale Licences apply. Licensees with established "quota" positions are given preference in the allocation procedure discussed earlier. In practice, the Forest Service accepts applications for these licences only from licensees with established "quota positions", most of whom are sawmill owners. All Interior Timber Sale Harvesting Licences refer to an "appurtenant mill" which must be maintained and operated by the licensee, with equipment for manufacturing chips as a by-product of lumber in order to utilize timber to "close utilization" standards. Timber Sale Harvesting Licences have grown to become the most significant tenure form in the Public Sustained Yield Units, accounting today for almost 60 per cent of the harvest in those units, and over 30 per cent of total provincial cut.

Long-term Timber Sale Harvesting Licences. Between 1965 and 1969 four licences in the northern Interior were issued to confer harvesting rights for 18, 19, and 21 years. Under the two 21-year licences the licensees agreed to construct and operate pulp mills of stipulated capacity, and stumpage was limited to the pulpwood rate for the initial years of their terms.

In 1973 another special form of Timber Sale Harvesting Licence, carrying a 12-year term, was introduced to allocate timber in Public Sustained Yield Units in the northern part of the province where the allowable cut was not fully committed under "quotas". To date, only five of these new licences have been issued. Apart from their 2-year longer term, they differ from normal Timber Sale Harvesting Licences in two important respects: their link with proposed development of manufacturing facilities, and the method of bidding and allocation among competitive applicants.

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[29] B.C. Forest Service *Annual Report, 1967*, p. 33.

Because no "quotas" had been allocated in the areas where existing licences of this type have been granted, no applicant was given preference over another. Those submitting tenders were required to bid a lump sum—not an amount per cunit of each species actually cut as in competitions for ordinary sales. The bonus bid was expressed in cents per cunit for the total 12-year volume licensed and could not be less than 5¢ per cunit. Any bonus bid was payable at the time of bidding and typically amounted to a substantial outlay, but this "earnest money" was returned to unsuccessful applicants. Bidding was, in effect, a competition for a licence which effectively conveyed a right to apply for a succession of Cutting Permits over 12 years without further competition.

Tenders were required to include a proposal for construction of a sawmill capable of using timber to "close utilization" standards and details of its design, construction and operating costs, manpower requirements, proposed waste control systems, marketing and distribution systems, and construction schedule and expenditures. Preference was given to proposals which included the "optimal combination of employment, social benefits, wood utilization and revenue", although the definition and weight ascribed to each of these factors was not clear.

These licences thus require an "appurtenant mill", as do other Timber Sale Harvesting Licences in the Interior. The licensed harvest was intended to serve only 80 per cent of the mill's requirements, the remainder to be acquired from other sources.

MILL LICENCES

In 1969 another instrument, the Mill Licence, was introduced in the province. Regulations passed under a Forest Act amendment[30] empowered the Minister to require anyone wishing to construct or expand a wood utilization plant to first obtain a Mill Licence.

To date, only three licences have been issued, all for 21-year renewable terms. The first authorized construction of a pulp mill in the East Kootenay, after the Pulpwood Harvesting Area designated for the region was cancelled. The licence authorizes construction and operation of the pulp mill at a certain capacity. It does not convey rights to any Crown timber, but in a letter attached to the licence the Minister gave assurances similar to those given to holders of Pulpwood Harvesting Area Agreements; namely that he would direct to the pulp mill the chips produced from "third band" Timber Sale Licences in certain local Public Sustained Yield Units, and from other Public Sustained Yield Units if necessary. As a last resort he would revoke "third band" sales and make volumes of roundwood available to the pulp mill.

The second Mill Licence was issued in connection with an expansion of a pulp mill owned by the holder of a Pulpwood Harvesting Area Agreement, with similar assurances being given. The owner of a particle board plant built in the southern Interior received the third, but the fibre assurances in the letter attached to that licence are somewhat less firm.

Mill Licences, in themselves, are not forms of tenure over Crown timber; they merely give permission to construct and operate manufacturing facilities.

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[30] Forest Act Amendment Act, 1968, S.B.C. 1968, c. 17, s. 11; B.C. Regulation, 183/69.

The attached assurances may be regarded as expressions of the Minister's intent, at that time, in exercising his discretion, but they do not convey any formal right to timber.

OLD TEMPORARY TENURES

Since 1907, when a moratorium was placed on them, no new old temporary tenures—Timber and Pulp Leases and Licences—have been issued by the province. From that date, the acreage covered by these tenures and their relative importance has gradually diminished, as licensees have liquidated the original timber or otherwise allowed them to revert to the Crown.

Under policies implemented in the first decade of this century, holders of these tenures had the right to renew them upon payment of an annual fee, so long as they contained merchantable timber in commercially valuable quantities. Any deletions from the original areas had to comprise at least 640 acres. Thus the 640-acre Timber Licences (the most significant group) were successively renewed in their entirety until all the commercially valuable timber was removed. Similar procedures applied to the Timber Berths after their administration was assigned to the province in 1930, although their larger size permitted 640-acre deletions of logged areas. Under these arrangements the licensees could often maintain a right to harvest timber which had become established long after the licences were first issued.

Amendments to the Forest Act in 1965 restricted the conditions under which these licences could be perpetuated, by enabling deletions of less than 640 acres and restricting renewals to areas containing merchantable timber that was established when the licence was first issued.[31] Thus the Forest Service was empowered to delete fractional areas of the tenures not supporting such growth, preventing a licensee from keeping his rights alive over the whole licence area simply by leaving some mature timber on a portion of it.

In addition the 1965 amendment replaced the previous mandatory provision, which directed the Minister to renew expiring tenures, with a discretionary one. However, successive Ministers have not exercised this power to decline renewal applications and have renewed them as they have expired. All outstanding Timber Leases were renewed between 1964 and 1972 for 21 years. The 21-year Pulp Leases, which came up for renewal in 1975, were extended for one year pending completion of this inquiry.

During the late 1960's a number of Timber and Pulp Licences were renewed for terms going beyond their traditional 1-year terms. Those included in some "perpetual" Tree-farm Licences were renewed until 1978, and those in certain 21-year Tree-farm Licences were extended for periods corresponding to the term of those licences. In addition, one coastal company was issued renewed licences with varying terms, extending to the year 2013, to conform to a harvesting schedule the company proposed to the Minister.

New licence documents issued since the 1965 amendments contain one other innovation. Before harvesting, holders of Timber Leases and Timber and Pulp Licences are required to submit for Forest Service approval a harvesting plan, which must incorporate current utilization requirements, environmental safeguards, and so on. Pulp Leases do not exact this obligation because their terms and conditions have not been re-cast since they were last renewed in 1954. Timber Berth documents have not recently undergone change, but new Regulations approved in 1975[32] require that a harvesting plan be submitted for Forest Service approval before cutting.

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[31] Forest Act Amendment Act, 1965, S.B.C. 1965, c. 13, s. 8.

INITIATIVES RECOMMENDED BY THE TASK FORCE ON CROWN TIMBER DISPOSAL

By the mid-1970's it had been almost two decades since the government had received independent advice on its forest policy. Early in 1974 the informal three-man Task Force on Crown Timber Disposal[33] was struck to investigate certain issues of public forest policy during the balance of that year. By its terms of reference, the Task Force was instructed to review, in particular, the royalty arrangements governing the old temporary tenures and the stumpage appraisal system.

During its short life the Task Force produced two reports—one dealing with royalties[34] applicable to the old temporary tenures and the other with stumpage appraisals[35]—as well as a background paper describing the forest tenure system.[36]

Royalties. In its first report, published in February, 1974, the Task Force recommended that the royalties applicable to the old temporary tenures no longer be based on a statutory schedule but instead on appraised stumpage values, like other Crown timber. Second, it advocated that the provincial Logging Tax be revised to rationalize it with the abatement provisions of the corporate income tax, thus eliminating most of the extra burden it imposed. And third, it recommended that the special one per cent *forest land* tax, which under the Taxation Act had been levied on old temporary tenures outside Tree-farm Licences since 1953, be repealed.

Legislation which would enable implementation of the first two proposals was introduced at the 1974 Spring Legislative Session, but had not been proclaimed at the date of this writing.[37] No action has been taken on the third.

Stumpage appraisal. The second Task Force report was completed in August, 1974. It examined the complex appraisal techniques that have been developed by the Forest Service since 1912 to fix the price of new allocations of Crown timber. The Task Force's recommendations concerning appraisals are too numerous and complex to be recounted here; they covered such diverse matters as allowances on invested capital, adjustments to stumpage rates, road financing, and the marketing of intermediate forest products. With respect to the latter, the Timber Products Stabilization Act[38] was subsequently passed by the Legislature in the fall of 1974, authorizing formation of a new Crown corporation, the Forest Products Board of British Columbia. Under the legislation the Board, once appointed, would have the power to deal in log and chip markets in the province, and to advise the government on intermediate forest products marketing.

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[32] B.C. Regulation, 275/75.

[33] The membership included A. V. Backman, E. L. Young, and myself as Chairman.

[34] *Task Force 1st Report, 1974.*

[35] *Task Force 2nd Report, 1974.*

[36] Task Force on Crown Timber Disposal, *Forest Tenures in British Columbia, op. cit.*

[37] Forest Amendment Act, 1974, S.B.C. 1974, c. 36, s. 16; Logging Tax Amendment Act, 1974, S.B.C. 1974, c. 50.

[38] S.B.C. 1974, c. 117.

The Act also empowered the Cabinet to fix the price to be paid for chips sold by sawmills to pulp mills. In early 1975[39] this authority was invoked for chips produced in the Interior, and a flat $35 per unit price was specified with some exceptions. Later, in 1976, this price was reduced slightly, and a new order set out a formula which ties future chip prices to market pulp prices[40] (see Chapter 21).

THE POLICY LEGACY

The evolution of provincial tenure policy into its present complex matrix of rights and responsibilities has taken more than a century. The most fundamental trend in this process has been the increasing reluctance of governments to alienate title to forest land; successive administrations have been disposed towards maintaining public ownership and granting only the rights to timber. This basic policy has focused attention on the development of contractual arrangements for conveying private rights over public resources, and these have emerged in considerable variety. The result is that, while the Crown retains title to most forest resources, the rights to use many of them have been committed to private parties under tenure arrangements that range very widely in terms of the extent of the private interests conveyed. Some clear trends are discernable in terms and conditions of forest rights. The arrangements for exacting the Crown's financial interest in timber have become steadily more rigorous and sensitive. The regulation of licensees, in terms of their harvesting practices, forestry activities, and resource use has also gradually increased. In some other respects, such as the duration of rights conveyed, trends are less obvious, however.

A second conspicuous theme, praticularly during the last three decades, has been the government's determination to regulate the harvest rate according to sustained yield criteria. This effort has profoundly affected not only the controls on operations but also the forms of tenure used and the manner of allocating them.

More recently, a new and important dimension to forest tenure policy has developed from demands for higher standards of forest practice and better accommodation of non-timber values. This has resulted in entirely new requirements for resource planning, approvals, and supplementary authorizations, which are implemented through the tenure system.

The legacy of this century of policy development is not altogether orderly. Each tenure form was introduced at a different time to meet contemporary needs, needs which no longer exist or have inevitably changed. Moreover, policy objectives and required standards of performance have changed over the decades, and as new policy innovations have been introduced they have reflected these changes also. The task of reforming forest tenure policy is thus to eliminate obsolete features, inconsistencies, and inadequacies that have emerged over the years, and shape a new system that will reliably serve the needs of the foreseeable future.

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[39] B.C. Regulations 36/75, 246/75, and 468/75.

[40] B.C. Regulations 168/76, 233/76.

APPENDIX B

STRUCTURE AND DIMENSIONS OF THE BRITISH COLUMBIA FOREST INDUSTRY

The Commission was instructed by its terms of reference to consider ". . . the structure of the forest industry, having regard to its pattern of integration, concentration, ownership and control; and . . . the structure of markets for forest products . . .". Accordingly, the Commission undertook a rather substantial investigation of the industry, bringing together and analysing all the relevant data available in published sources, Forest Service documentation, and submissions presented at the public hearings. A good deal of information and explanation was obtained through direct communication with industrial associations and companies.

Some of the findings are reported in the body of the report, especially Chapter 4, which describes the industry's structure and the patterns of control over timber rights and manufacturing capacity, and Chapter 21, which deals with marketing. This Appendix provides supplementary statistical information and explanation.

DIMENSIONS OF THE INDUSTRY

It is most useful to begin with a description of the several sectors of the industry, their size, structure, and trends.

THE EXTRACTIVE SECTOR

The volume of timber cut in British Columbia in 1975 totalled 17.6 million cunits—7.5 million cunits on the Coast and 10.1 million cunits in the Interior.

Table B-1

THE TIMBER HARVEST, 1966 TO 1975

year	Coast	Interior	total
		millions of cunits	
1966	9.1	6.9	16.0
1967	9.0	6.7	15.7
1968	9.9	7.2	17.0
1969	9.9	9.0	18.9
1970	10.2	9.1	19.3
1971	10.0	9.9	20.0
1972	8.7	11.2	19.9
1973	11.6	13.2	24.8
1974	9.8	11.4	21.2
1975	7.5	10.1	17.6

Source: B.C. Forest Service.

Table B-1 shows the harvest from the Coast and Interior Forest Districts for each year from 1966 to 1975. The coastal harvest exceeded that in the Interior until 1972; since then the Interior harvest has consistently been larger. The table also indicates that the total provincial harvest in 1975 was the smallest since 1968.

Species composition. The timber cut in British Columbia consists almost entirely of coniferous softwoods. Hitherto, one of the most important and valuable species has been Douglas fir, but the harvest of this species has declined from 33 per cent of total provincial harvest in 1960 to 14 per cent in 1975. The most important species now, in terms of volume harvested, are spruce, hemlock, lodgepole pine, and then Douglas fir. The latter comprises only a very small fraction of the remaining inventory of mature timber. In 1975, these four species comprised 72 per cent of the total provincial harvest. The species distribution of provincial harvest, and the trends over the last 15 years, are indicated in Table B-2.

Table B-2

BRITISH COLUMBIA TIMBER HARVEST BY SPECIES, 1960, 1966, AND 1975

year	Douglas fir	cedar	spruce	lodgepole pine	hemlock	true firs	other coniferous	hardwoods and miscellaneous
	per cent of total							
1960	32.5	12.7	16.7	3.8	22.6	7.9	3.4	.4
1966	24.0	13.0	20.3	5.6	23.0	10.6	2.8	.7
1975	14.2	12.0	22.1	15.7	20.0	12.6	2.4	1.0

Source: B.C. Forest Service.

Tenure source. The timber harvest can also be identified by tenure of origin, as summarized in Table B-3 for the years 1960, 1966, and 1975.

Table B-3

THE HARVEST BY TENURE OF ORIGIN, 1960, 1966, AND 1975

tenure	1960	1966	1975
	per cent of total		
Public Sustained Yield Units	50.2	45.0	55.9
Tree-farm Licences[1]	10.6	14.4	16.4
old temporary tenures[2]	18.4	18.8	11.9
Crown-grants[2]	18.8	18.8	13.0
miscellaneous[3]	2.0	3.1	2.8

[1] "Schedule B" lands only.

[2] Includes old temporary tenures and Crown grants inside Tree-farm Licences.

[3] Includes Farm Wood-lots, beachcombing, trespasses, and other miscellaneous sources.

Source: B.C. Forest Service.

Employment and Crown revenue. The logging industry employed almost 22 thousand persons in 1974. Some 18 thousand were employed in production and the balance in various support or administrative positions. There are no reliable data on the value of the total harvest because most of the timber cut in the province is manufactured without passing through a market. However, Statistics Canada imputes a value to the harvest of $1.6 billion in 1974, which includes the $197 million in stumpage and other direct Crown charges collected that year.

Timber harvesting generates public revenues both directly and indirectly. Crown charges in the form of stumpage, royalty, and other fees are levied directly on the harvest and are readily identifiable. Substantial revenues in the form of income and indirect taxes also arise from logging activity but are not easily identifiable. In 1975, direct revenues totalled almost $60 million, of which stumpage and royalty accounted for $50 million or 85 per cent. Direct revenues in that year were substantially below those of 1973 and 1974 as Table B-4 indicates. The annual fluctuations in direct revenues are due largely to the volatility of stumpage charges, which vary as a result of changes in both market conditions and harvest levels.

Table B-4

DIRECT FOREST REVENUES 1966 TO 1975

year	stumpage	royalty	other charges	total
	millions of dollars			
1966	42.6	3.1	3.3	49.0
1967	34.7	3.5	3.8	42.0
1968	44.4	5.0	4.4	53.8
1969	78.3	6.3	4.9	89.5
1970	53.5	6.2	5.3	65.0
1971	49.7	5.6	5.6	60.9
1972	91.2	5.3	6.1	102.6
1973	230.6	6.9	7.3	244.8
1974	181.6	7.5	8.1	197.2
1975	43.4	6.1	10.5	60.0

Source: B.C. Forest Service.

In addition to these levies, the province realizes further direct revenue from the Logging Tax, a tax on the net income derived from logging operations and the processing of logs or log products.[1] Revenue from this tax in the 1973/74 fiscal year was $23.1 million.

MANUFACTURING

Most of the timber cut is processed in manufacturing plants in the province. In 1973, 53 per cent of the timber consumed in British Columbia was manufactured into lumber. Pulp and paper accounted for 40 per cent, but relied heavily on by-product wood chips as their main source of raw material. The consumption of timber by manufacturing sectors in 1973 is summarized in Table B-5.

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[1] Since April 1968, the rate of logging tax has been 15 per cent of taxable net income over $10 thousand per annum (see also Chapter 13).

Table B-5

TIMBER CONSUMPTION BY MANUFACTURING SECTOR, 1973

sector	Interior	Coast	total
	per cent		
lumber	56	49	53
pulp and newsprint			
—from sawmill residues	28	24	26
—from roundwood	9	20	14
plywood and miscellaneous	7	7	7
total	100	100	100

Source: Task Force on Crown Timber Disposal, *Forest Tenures in British Columbia, op. cit.*, pp. 5-6.

A small volume of logs is exported from British Columbia each year. Over the last ten years these log exports have averaged only 1.3 per cent of total provincial harvest, ranging from a high of 501 thousand cunits (2.6 per cent of provincial harvest) in 1970 to a low of 48 thousand cunits (0.2 per cent of provincial harvest) in 1973. In 1975, some 150 thousand cunits (0.8 per cent of provincial harvest) of logs were exported from British Columbia: 69 thousand cunits to the United States and 81 thousand cunits to Japan (see Appendix E, Table E-1).

In terms of employment, income generation, and value of production, forest products manufacturing constitutes the largest and most important segment of British Columbia's industrial economy. Table B-6 summarizes the annual production of each of these sectors from 1966 to 1975. The table clearly shows the growth of the pulp and Interior lumber sectors, as well as the fluctuations in output over the years.

Table B-6

PRODUCTION OF THE BRITISH COLUMBIA FOREST INDUSTRY, 1966 TO 1975

year	lumber Coast	lumber Interior	lumber total	pulp	paper	plywood
	millions of board feet			thousands of tons		millions of square feet, ⅜″ basis
1966	3,680	3,639	7,319	3,669	1,662	1,739
1967	3,913	3,197	7,110	3,868	1,651	1,713
1968	4,144	3,667	7,811	4,378	1,706	1,852
1969	3,911	3,785	7,696	4,850	1,908	1,858
1970	3,790	3,867	7,657	4,521	1,801	1,731
1971	4,186	4,785	8,971	4,776	1,916	1,863
1972	4,028	5,495	9,523	4,909	1,958	2,006
1973	4,403	6,038	10,441	5,695	2,225	2,203
1974	3,405	5,378	8,783	5,812	2,147	1,767
1975	2,504	4,965	7,469	4,348	1,633	1,719

Source: Council of Forest Industries; Statistics Canada.

The value of lumber produced in 1974 is estimated at $1.5 billion; pulp and paper at $1.4 billion; and veneer and plywood at $307.6 million.[2]

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[2] Measured as the dollar value of manufacturing shipments. Shipments differ from production in any one year to the extent of any change in inventories.

Together, these sectors accounted for approximately half of the value of total provincial manufacturing activity. In terms of employment, a total of 31.6 thousand persons were employed in 1974 in lumber manufacturing; 13.2 thousand in pulp and paper production; and 7.8 thousand in the veneer and plywood sector. Together with employment in the logging sector, the forest industry directly accounted for 9 per cent of total provincial employment in that year.

MARKETS FOR FOREST PRODUCTS

Except for veneer and plywood, most of the manufactured products of the B.C. forest industry are exported to foreign markets, providing the province's main source of export earnings. The final destination of the main product categories of the B.C. forest industry in 1972 is summarized in Table B-7.

Table B-7

DESTINATION OF B.C. FOREST INDUSTRY SHIPMENTS, 1972

sector	destination of shipments						
	B.C.	Canada	U.S.	U.K.	Japan	E.E.C.	others
	per cent of volume of shipments						
lumber	5	15	68	4	4	1	3
pulp	18	—	29	7	11	23	12
paper	16	1	50	9	3	3	18
veneer and plywood	18	60	—	16	—	6	1

Source: Adapted from F. L. C. Reed and Associates, *Selected Forest Industry Statistics of British Columbia,* B.C. Forest Service, Victoria, 1976. Tables VIII—1, 2, 3, 4.

Lumber. In the first two decades of this century the export sales of British Columbia lumber mills declined yearly, losing ground in traditional markets to highly efficient producers in the United States whose sales expanded rapidly. In response to this competition, locally-owned selling agencies were established to develop overseas markets for B.C. forest products. During the 1920's, the lumber industry grew steadily, until the Great Depression eroded both domestic and export markets. British Commonwealth trade arrangements initiated in 1932 and continued efforts by B.C. lumbermen to sell in Britain provided the base for the gradual recovery of the B.C. lumber industry. Today, forest products manufactured in British Columbia enjoy wide acceptance in markets around the world.

For many years the North American continent, particularly the United States, has provided the main market for the province's lumber. In 1972 about 63 per cent of the lumber shipments to the U.S. were sold in the midwestern market, with a further 32 per cent directed to the Atlantic and Gulf coasts. Of the shipments to the U.S., 68 per cent were transported by rail and 30 per cent by water. Apart from some coastal trade, lumber is normally shipped by truck and rail to markets within Canada. Of domestic shipments in 1972, about 27 per cent was sold in British Columbia, 19 per cent was shipped to the prairie provinces, and 44 per cent to Ontario. All other markets are served by water transport.

Pulp and paper. In 1972, 82 per cent of the pulp produced in British Columbia was sold outside the province, the balance being retained for conversion to paper and paperboard. The United States is the largest single market for

B.C. pulp, accounting for 30 per cent of total shipments in 1972. Of this, 21 per cent was shipped by water to the Pacific coast, 47 per cent by rail to the mid-western states, and 32 per cent by either water or rail to the Atlantic and Gulf coasts. The remaining export markets are served by water transport.

Of British Columbia's paper production in 1972, about 84 per cent was shipped to markets outside the province. Some 40 per cent was shipped by either rail or water to the U.S. Pacific coast, and 10 per cent by rail to the U.S. mid-western states. Offshore markets are served by water transport.

Veneer and plywood. During the last decade an average of 78 per cent of B.C. veneer and plywood production has been sold in Canada. Of these domestic shipments in 1972, 70 per cent were shipped by rail to markets east of the Rockies. The United Kingdom has consistently been the largest export market, absorbing 16 per cent of shipments in 1972, with the European Economic Community taking an additional 6 per cent.

Table B-8 summarizes the "current dimensions" of the British Columbia forest industry.

Table B-8

DIMENSIONS OF THE BRITISH COLUMBIA FOREST INDUSTRY, 1974

sector	value of shipments	employment		destination of shipments[3]		
		production	total	B.C.	other Canada	other countries
	billions of dollars	thousands		per cent		
logging	1.6	18.1	21.7	99	—	1
lumber	1.5	27.3	31.6	6	17	77
pulp and paper	1.4	13.2	18.4	25	—	75
veneer and plywood	.3	7.0	7.8	12	66	22
other wood products[1]	.2	4.5	5.5	n/a	n/a	n/a
	3.4[2]	70.1	85.0			

[1] Includes minor wood industries such as the shake, shingle, sash and door, and wooden box sectors.
[2] This figure does not include the value of logging shipments as this is reflected in the values of the manufactured products.
[3] These figures refer to 1974 and so differ slightly from those in Table B-7. 1972 data were used in the discussion of product markets because 1974 data were not available in a similarly disaggregated form.
Source: Statistics Canada and previous tables.

RIGHTS TO TIMBER AND FOREST LAND

The pattern of control over timber harvesting rights is an important aspect of the structure of British Columbia's forest industry. The analysis in Chapter 4 indicates that timber rights on the Coast and in the Interior are heavily concentrated in the hands of a relatively small number of large corporations. The following pages provide supplementary information concerning the control of holdings in each Forest District and for the province as a whole; and also some information on recent trends in the concentration of timber harvesting rights.

In order to portray corporate control in the several sectors of the industry, company holdings have been compiled by *controlling companies*. As explained in Chapter 4, a controlling company includes not only the company having that name, but also any other companies in which it holds 50 per cent or more of the outstanding voting shares (with a couple of exceptions, also noted in Chapter 4).

As explained elsewhere in this report, rights to harvest timber in British Columbia take a wide variety of forms. For present purposes, it is convenient to distinguish two general categories: those that provide a right to a regulated allowable annual cut, and those that are "unregulated".

The regulated harvest. The regulated harvest includes timber on Crown land within public and private sustained yield units, and on Crown-granted land which has been incorporated into Tree-farm Licences. Within these units, timber harvesting rights are allocated to licensees as an allowable annual cut which confers the right to a specified annual harvest for the term of the licence. This authorized annual harvest is referred to here as the *committed* allowable annual cut, and provides the measure for analysing the pattern of control over regulated harvesting rights.

The allowable annual cut committed to each licensee throughout the province was compiled from data provided by the B.C. Forest Service[3] and aggregated under controlling companies. Only those controlling companies having at least 25 thousand cunits of allowable annual cut are treated individually; data on the remainder have been aggregated. Province-wide, 75 controlling companies were identified as holding this minimum volume of harvesting rights.

Tables 4-2 and 4-3 in Chapter 4 examined the distribution of committed harvesting rights on the Coast and in the Interior. Table B-9 aggregates the

Table B-9

DISTRIBUTION OF COMMITTED HARVESTING RIGHTS AMONG CONTROLLING COMPANIES IN BRITISH COLUMBIA[1]

controlling company	Public Sustained Yield Units	Tree-farm Licences	total	*share of provincial total*
	committed allowable cut at July 2nd, 1975			
	thousands of cunits			*per cent*
MacMillan Bloedel	93.3	2,686.4	2,779.7	*12.8*
B.C. Forest Products	1,393.5	508.1	1,901.6	*8.8*
B.C. Cellulose	616.5	1,135.0	1,751.5	*8.1*
Canadian Forest Products	837.4	404.0	1,241.4	*5.7*
Northwood	958.7	178.3	1,137.0	*5.2*
Crown Zellerbach	361.0	613.9	974.9	*4.5*
Rayonier	44.1	859.4	903.5	*4.2*
Weldwood	574.7	201.0	775.7	*3.6*
Eurocan	404.2	312.0	716.2	*3.3*
Tahsis	216.0	302.0	518.0	*2.4*
total above 10	5,499.4	7,200.1	12,699.4	*58.7*
next 15 largest	4,162.8	228.6	4,391.4	*20.3*
next 25 largest	2,521.6	10.1	2,531.7	*11.7*
next 25 largest	1,033.7	12.7	1,046.4	*4.8*
total: above 75 companies	13,217.5	7,451.4	20,668.9	*95.5*
total province	14,160.7	7,462.7	21,623.1	*100.0*
per cent of above 75 companies in provincial total	*93.3*	*99.8*	*95.6*	

[1] Includes harvest from all Crown-granted land within Tree-farm Licences, and excludes harvest from Taxation Tree Farms which are not within Tree-farm Licences.

Source: Compiled from various data supplied by the B.C. Forest Service.

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[3] While the Forest Service provided much of the data, it is not responsible for the Commission's compilations of it. Many assumptions and estimates are involved in the data presented here.

information contained in these two tables, summarizing the total provincial distribution of timber harvesting rights.

This table shows that the 75 controlling companies hold rights to 95.6 per cent of the committed allowable cut in the province. Within this group the distribution of rights is highly concentrated, the largest 10 controlling companies holding almost 59 per cent and the largest 25 holding 79 per cent.

The one million cunits of annual harvesting rights not held by these 75 controlling companies are distributed among some 280 small licensees: 185 licensees hold rights to less than 1,000 cunits; 68 hold rights between 1,000 and 9,999 cunits; and 27 hold rights between 10,000 and 24,999.

The distribution of harvesting rights, aggregated for large regions such as the Coast and Interior or for the province as a whole, inevitably shows a lower degree of concentration than exists within smaller regions. To provide some insight into regional concentration of timber holdings, the distribution of committed harvesting rights has been analysed for individual Forest Districts. This information is summarized in Table B-10, which shows the percentage of committed allowable cut held by the ten largest controlling companies in each District.[4] While the degree of concentration varies among Districts, ten controlling companies hold at least 80 per cent of the committed annual harvesting rights in each.

Table B-10

COMMITTED HARVESTING RIGHTS HELD BY THE TEN LARGEST CONTROLLING COMPANIES IN EACH FOREST DISTRICT, 1975

Forest District	Public Sustained Yield Units	Tree-farm Licences	total
		per cent	
Vancouver	68.2	99.8	89.4
Prince Rupert (Coast)	80.8	100.0	93.3
Prince Rupert (Interior)	89.5	100.0	92.7
Prince George	80.6	100.0	81.3
Cariboo	93.0	100.0	93.3
Kamloops	78.7	100.0	80.9
Nelson	79.7	100.0	85.2

Source: Compiled from various data supplied by the B.C. Forest Service.

The unregulated harvest. The unregulated harvest originates, in most part, from Crown-granted land and old temporary tenures which have not been incorporated into Tree-farm Licences. These rights cannot be quantified in terms of an allowable annual cut, and so here they are measured in terms of the area of unregulated forest land held by each company. The distribution of these holdings by controlling company was presented in Chapter 4 (Table 4-4). In brief, the ten controlling companies with the largest holdings of Crown-granted land control 81.5 per cent of the total, with the largest three—Pacific Logging, MacMillan Bloedel, and Crown Zellerbach—holding 60.8 per cent. The ten controlling companies with the largest holdings of unregulated old temporary tenures control 83.5 per cent of the total, with MacMillan Bloedel and Crown Zellerbach controlling 50 per cent.

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[4] The ten largest controlling companies are not the same in each Forest District and often include companies which are not among the ten largest controlling companies in the province, as listed in Table B-9.

Examination of the tables in Chapter 4 and in this Appendix suggests that the control over unregulated forest land is as concentrated as the control over regulated harvesting rights. These tables also reveal that the large controlling companies that dominate the holdings of old temporary tenures and Crown-granted forest land are among the companies with the largest rights to the regulated timber supply.

Trends in concentration of timber rights. The concentration of control over timber harvesting rights has increased sharply over the last couple of decades. Since this trend has figured importantly in the Commission's investigations, it is useful to document it in terms of the major tenure forms.

i) *Public Sustained Yield Units.* Between 1968 and 1975, the allowable annual cut in Public Sustained Yield Units more than doubled; but despite this substantial increase in the available timber supply, the concentration of control over the regulated harvest in these units increased considerably. This is reflected in Table B-11, which shows that, during these seven years, the largest controlling company has increased its holdings in Public Sustained Yield Units from 6 per cent of the total committed allowable cut in 1968 to 10 per cent in 1975, and that the holdings of the largest 20 firms have increased from 49 per cent to 64 per cent of the total.

Table B-11

CONCENTRATION OF CONTROL OVER TIMBER HARVESTING RIGHTS IN PUBLIC SUSTAINED YIELD UNITS, 1968 AND 1975

	1968		1975	
controlling companies	committed allowable annual cut	*share of total*	committed allowable annual cut	*share of total*
	millions of cunits	*per cent*	millions of cunits	*per cent*
single largest	.3	*5.5*	1.4	*10.2*
four largest	.5	*16.5*	3.8	*26.6*
eight largest	1.6	*28.5*	5.7	*40.1*
twenty largest	2.8	*48.6*	9.1	*63.7*
total commitment	5.7[1]	*100.0*	14.2[1]	*100.0*

[1] Data for 1968 cover only 73 of the 78 Public Sustained Yield Units in existence in that year, whereas the 1975 data encompass all 80 units.

Source: M. R. MacLeod, "The Degree of Economic Concentration in the British Columbia Forest Industry", unpublished B.S.F. thesis, U.B.C., 1971, p. 109; and data provided by the B.C. Forest Service.

The concentration of timber holdings is reflected also in the number of licensees holding timber rights in Public Sustained Yield Units. Despite the fact that total productive acreage in these units increased from 48.9 million in 1962 to 80 million in 1974, the number of licensees declined from 1,529 in 1960, to 850 in 1968, and to 594 in 1974.[5]

ii) *Old temporary tenures.* Indicative data on the concentration of holdings of old temporary tenures over the years are available only for Timber Licences—the largest of the several licence forms in this category. Of the 4 million acres outstanding in Timber Licences in 1944, 51.7 per cent were held by 58 persons or corporations, the balance being held by 2,800 others.[6] By 1954 this had changed drastically: of the 2.5 million acres then outstanding, four persons or corporations held 51 per cent and nine held 68.5 per cent.[7] In 1965 there were 1.5 million acres outstanding, with four firms controlling 65 per cent and eight controlling 82 per cent. While the acreage in old temporary tenures continues to decline, the concentration of the remaining holdings has increased to the point where five firms now control almost 80 per cent of the acreage.

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[5] These numbers do not recognize the inter-company affiliations accounted for in the earlier compilations of "controlling companies" because comparative data on that basis are not available.

iii) *Crown-granted forest land.* Although there was an early trend towards concentration of ownership of Crown-granted forest land, the pattern has been relatively stable for the past two decades. While one-third of the acreage had been held by four owners in 1945, one-half was held by two owners in 1955.[8] During this time, the proportion of Crown-granted timber land held by persons each having less than 20 thousand acres fell from two-thirds of the total to less than one-third. Data presented in Chapter 4 (Table 4-4) indicate that three controlling companies—Pacific Logging, MacMillan Bloedel, and Crown Zellerbach—currently hold more than 58 per cent of the Crown-granted forest land which lies outside Tree-farm Licences and Taxation Tree Farms.

THE MANUFACTURING SECTORS

The structure of the three main processing sectors of the B.C. forest industry—lumber, pulp and paper, and veneer and plywood—will next be examined in terms of the distribution of ownership and control of productive capacity and trends in concentration.

Lumber. Several sources[9] enable a preliminary listing of sawmills in B.C., and their individual mill capacities were verified with data provided by the B.C. Forest Service. The list includes only those mills with capacities of at least 15 thousand f.b.m. per shift. There are numerous smaller mills, but they operate infrequently and make little contribution to total production.[10] The capacities of all mills have been aggregated and attributed to controlling companies.

Both the number of sawmills and their total capacity are greater in the Interior than on the Coast, although average mill size on the Coast is larger. In the Interior, 179 controlling companies operate 248 sawmills with an average mill capacity of 77 thousand f.b.m. per shift, while on the Coast 71 controlling companies operate 98 mills with an average capacity of 115 thousand f.b.m. per shift. Despite these differences, the patterns of concentration over sawmilling capacity in the two regions are roughly similar, as Table B-12 shows.

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[6] Timber Licences accounted for 62 per cent of the acreage outstanding in old temporary tenures in 1974.

[7] D. M. Carey, "Forest Tenure in British Columbia" in *Transactions of the Ninth British Columbia Natural Resources Conference,* Colonist Printers, Victoria, 1956, p. 271.

[8] Report to the Commissioner, Department of Finance, to be found in the transcript of the 1956 Sloan Commission; Exhibit 143, p. 6713.

[9] *British Columbia Lumberman Greenbook,* Southam Business Publications, Vancouver, 1974, 242 pp.; *Madison's Canadian Lumber Directory,* Madison, Vancouver, 1975, 182 pp.; *The "ABC" British Columbia Lumber Trade Directory,* Progress Publishing, Vancouver, 1973, 355 pp.; "Individual Company Listings and Production", *Forest Industries,* 102(7), 1975, pp. 47–57.

[10] Since the smaller sawmills are excluded from the analysis, the share of capacity indicated for each company slightly overstates their share of the provincial total.

Table B-12

CONCENTRATION OF CONTROL OF SAWMILL CAPACITY, 1975

proportion of total capacity	Coast: controlling companies		Coast: capacity per shift	Interior: controlling companies		Interior: capacity per shift
per cent	number	*per cent*	million f.b.m.	number	*per cent*	million f.b.m.
25	2	*2.8*	3.2	6	*3.4*	4.9
50	6	*8.5*	5.5	18	*10.1*	9.7
75	18	*25.4*	8.4	48	*26.8*	14.3
100	71	*100.0*	11.3	179	*100.0*	18.7

Source: Compiled from data obtained from the B.C. Forest Service and from publications listed in footnote 9.

The control of sawmill capacity by the largest firms is portrayed in Table B-13. The two largest firms—MacMillan Bloedel and B.C. Forest Products—together control 13.6 per cent of provincial lumber manufacturing capacity and these, together with Northwood, Canadian Forest Products, and Weldwood, control 25 per cent of the total.

Table B-13

DISTRIBUTION OF SAWMILLING CAPACITY IN BRITISH COLUMBIA, 1975

controlling company	capacity per shift	*share of provincial capacity*
	million f.b.m.	*per cent*
MacMillan Bloedel	2.2	*7.2*
B.C. Forest Products	1.9	*6.4*
Northwood	1.3	*4.3*
Canadian Forest Products	1.1	*3.6*
Weldwood	1.0	*3.4*
Crown Zellerbach	1.0	*3.4*
B.C. Cellulose	.9	*3.1*
Weyerhaeuser	.7	*2.2*
West Fraser	.7	*2.2*
Triangle Pacific	.6	*1.9*
Netherlands	.6	*1.9*
Evans Products	.6	*1.9*
Rayonier	.5	*1.8*
C. Itoh	.5	*1.6*
Crestbrook	.5	*1.6*
Doman	.4	*1.4*
Tahsis	.4	*1.3*
Whonnock	.4	*1.3*
total above 18	15.2	*50.5*
next 39 largest	7.2	*24.2*
remaining 183	7.6	*25.3*
total, all 240	30.0	*100.0*

Source: Compiled from data obtained from the B.C. Forest Service and from the publications listed in footnote 9.

The sawmilling sector has undergone substantial transformation during the past few decades in response to economic forces, technological changes, and government forest policies. The uninterrupted recent trend has been toward fewer sawmills and increasing average mill capacity. Table B-14 shows that while the number of operating mills in the province has declined substantially since 1955, the aggregate productive capacity has remained relatively constant, with a resultant threefold increase in average mill capacity over the 20 years preceeding 1974.

Table B-14

SAWMILL NUMBERS AND CAPACITY, 1950 TO 1974

year	number of mills	capacity per shift total	 average per mill
		thousand f.b.m.	
1950	1,826	19,143	10.5
1955	2,489	28,016	11.3
1960	1,938	29,432	15.2
1965	1,191	27,641	23.2
1970	881	23,670	26.9
1974	787	26,596	33.8

Source: B.C. Forest Service; Statistics Canada.

Table B-15 further documents the trend of increasing average mill size and the decline in the number of small mills. In 1955, sawmills with an average capacity of less than 40 thousand f.b.m. per shift totalled 97.1 per cent of the total number of operating sawmills while by 1975 the number of mills below that size had declined to 72.7 per cent of the total.

Table B-15

DISTRIBUTION OF SAWMILLS BY CAPACITY, 1955, 1968, AND 1975

capacity per shift	1955		1968		1975	
thousand f.b.m.	number	*per cent*	number	*per cent*	number	*per cent*
1 to 40	2,417	*97.1*	786	*87.2*	572	*72.7*
41 to 80	43	*1.7*	67	*7.4*	85	*10.8*
81 to 120	8	*.3*	20	*2.2*	47	*6.0*
121 to 200	14	*.6*	16	*1.8*	56	*7.1*
201 and over	7	*.3*	13	*1.4*	27	*3.4*
	2,489	*100.0*	902	*100.0*	787	*100.0*

Source: Compiled from data obtained from the B.C. Forest Service and from M. R. MacLeod, *op. cit.*

Furthermore, the present distribution of aggregate capacity is more heavily concentrated in the moderate to large sized mills than it was in 1955. In 1955, mills with a capacity of more than 80 thousand f.b.m. per shift accounted for a little more than 1 per cent of total capacity, while in 1975 they accounted for 16.5 per cent.

Pulp and paper. Although virtually all of the paper manufactured in British Columbia is produced at integrated pulp and paper mills, for the sake of simplicity and to avoid duplication, pulp capacity and paper capacity will be examined separately.[11]

On the Coast, MacMillan Bloedel clearly dominates the control over pulp capacity, with 42.1 per cent of the regional total. In the Interior, two companies—Canadian Forest Products and Weyerhaeuser—together control 45.3 per cent of the total capacity. The distribution of pulp capacity for the Coast and Interior regions is presented in Tables B-16 and B-17 respectively.

Table B-16

DISTRIBUTION OF PULP CAPACITY ON THE COAST, 1975

controlling companies	number of mills	capacity	*share of Coast capacity*
		tons/day	*per cent*
MacMillan Bloedel	3	5,200	*42.1*
B.C. Forest Products	1	1,550	*12.6*
B.C. Cellulose	2	1,300	*10.5*
Crown Zellerbach	1	1,000	*8.1*
Rayonier	2	1,000	*8.1*
Eurocan	1	915	*7.4*
Tahsis	1	750	*6.1*
Canadian Forest Products	1	550	*4.5*
Scott Paper	1	75	*.6*
total	13	12,340	*100.0*

Source: Compiled from data obtained from the B.C. Forest Service and from the publications listed in footnote 11.

Table B-17

DISTRIBUTION OF PULP CAPACITY IN THE INTERIOR, 1975

controlling companies	number of mills	capacity	*share of Interior capacity*
		tons/day	*per cent*
Canadian Forest Products	2	1,450	*24.3*
Weyerhaeuser	1	1,250	*21.0*
Northwood	1	800	*13.4*
Weldwood	1	750	*12.6*
B.C. Cellulose	1	600	*10.1*
B.C. Forest Products	1	550	*9.2*
Crestbrook	1	400	*6.7*
Finlay	1	160	*2.7*
total	9	5,960	*100.0*

Source: Compiled from data obtained from the B.C. Forest Service and from the publications listed in footnote 11.

In the province as a whole, there are 22 pulp mills owned by 14 controlling companies. Aggregate capacity is 18.3 thousand tons per day, of which over

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[11] Listings of pulp and paper mills were obtained from The Council of Forest Industries, brief submitted to the Public Inquiry on Pollution Control Objectives in the Forest Products Industry, March, 1976, 495 pp.; and *Lockwood's Directory of the Paper and Allied Industries,* Vance Publishing, New York, 1975, 695 pp. Mill capacities were verified with data provided by the Forest Service and by various firms in submissions to this Commission.

28 per cent is controlled by MacMillan Bloedel. The four largest companies control 61 per cent of capacity while the largest eight account for 84 per cent. The provincial distribution of pulp capacity is summarized in Table B-18.

Table B-18

DISTRIBUTION OF PULP CAPACITY IN BRITISH COLUMBIA, 1975

controlling companies	number of mills	capacity	*share of provincial capacity*
		tons/day	*per cent*
MacMillan Bloedel	3	5,200	*28.4*
B.C. Forest Products	2	2,100	*11.5*
Canadian Forest Products	3	2,000	*10.9*
B.C. Cellulose	3	1,900	*10.4*
Weyerhaeuser	1	1,250	*6.8*
Crown Zellerbach	1	1,000	*5.5*
Rayonier	2	1,000	*5.5*
Eurocan	1	915	*5.0*
Northwood	1	800	*4.4*
Weldwood	1	750	*4.1*
Tahsis	1	750	*4.1*
Crestbrook	1	400	*2.2*
Finlay	1	160	*.8*
Scott Paper	1	75	*.4*
total	22	18,300	*100.0*

Source: Compiled from data obtained from the B.C. Forest Service and from the publications listed in footnote 11.

Paper is manufactured at nine mills, six of which are integrated with pulp plants. The integrated mills are those of MacMillan Bloedel at Port Alberni and Powell River; Crown Zellerbach at Elk Falls; B.C. Forest Products at Crofton; Canadian Forest Products at Prince George; and Scott Paper at New Westminster.

The distribution of paper capacity in British Columbia is summarized in Table B-19. MacMillan Bloedel clearly dominates, with three mills accounting for 56.6 per cent of the total capacity. The three largest producers—MacMillan Bloedel, Crown Zellerbach, and B.C. Forest Products—control 84 per cent of total capacity.

Table B-19

DISTRIBUTION OF PAPER CAPACITY IN BRITISH COLUMBIA, 1975

controlling companies	number of mills	capacity	*share of provincial capacity*
		tons/day	*per cent*
MacMillan Bloedel	3	3,500	*56.6*
Crown Zellerbach	1	940	*15.2*
B.C. Forest Products	1	750	*12.2*
Canadian Forest Products	1	315	*5.1*
B.C. Cellulose	1	300	*4.9*
Belkin	1	225	*3.6*
Scott Paper	1	150	*2.4*
total	9	6,180	*100.0*

Source: Compiled from data obtained from the B.C. Forest Service and from the publications listed in footnote 11.

The production of pulp and paper has always been capital intensive, and as new production methods have been developed, plant size has increased steadily. The optimum size of a chemical pulp mill has risen from about 250 tons per day to something in the order of 800 tons. For newsprint mills the optimum size of a one-machine plant has risen from 90 thousand tons per year to 200 thousand during the past 25 years.

Veneer and plywood. Less than half (46 per cent) of veneer and plywood capacity is now located on the Coast, all within the Vancouver Forest District. The 54 per cent located in the Interior is divided roughly equally among the four Interior Forest Districts. The pattern of control of capacity in the two regions is similar: one-quarter of the capacity is controlled by 15 per cent of the companies, one-half by 30 per cent, and three-quarters by just over 50 per cent of the controlling companies. The distribution of veneer and plywood capacity in the Coast and Interior regions is summarized in Tables B-20 and B-21 respectively.

Table B-20

DISTRIBUTION OF VENEER AND PLYWOOD CAPACITY ON THE COAST, 1975

controlling companies	number of mills	capacity	*share of Coast capacity*
		cunits/shift	*per cent*
MacMillan Bloedel	2	370.0	*25.8*
Weldwood	3	320.0	*22.4*
Canadian Forest Products	1	300.0	*21.0*
B.C. Forest Products	3	190.0	*13.3*
Crown Zellerbach	1	120.0	*8.4*
Victoria Plywood	1	90.0	*6.3*
Richmond Plywood	1	40.0	*2.8*
total	12	1,430.0	*100.0*

Source: Compiled from data obtained from the B.C. Forest Service.

Table B-21

DISTRIBUTION OF VENEER AND PLYWOOD CAPACITY IN THE INTERIOR, 1975

controlling companies	number of mills	capacity	*share of Interior capacity*
		cunits/shift	*per cent*
Weldwood	2	296.0	*17.4*
North Central Plywood	1	227.3	*13.4*
Merrill & Wagner	1	206.0	*12.1*
Evans Products	2	166.5	*9.8*
Crown Zellerbach	2	162.6	*9.6*
Canadian Forest Products	2	149.8	*8.8*
Integrated Wood Products	1	143.0	*8.4*
McBride Plywood	1	94.3	*5.6*
Crestbrook	1	81.0	*4.8*
B.C. Cellulose	1	70.0	*4.1*
Federated Co-op	1	57.0	*3.4*
Hedberg Veneer	1	44.3	*2.6*
total	16	1,697.8	*100.0*

Source: Compiled from data obtained from the B.C. Forest Service.

Table B-22 summarizes the distribution of capacity in the province as a whole and shows that there is a higher degree of concentration of control at the provincial level than in either the Coast or Interior regions considered separately. This is because some of the larger companies—Weldwood, Canadian Forest Products, and Crown Zellerbach—have capacity in both regions, while the operations of the smaller companies are confined to one region. The table shows that Weldwood controls almost 20 per cent of provincial capacity, and over one-half of the total capacity is controlled by the largest four firms and three-quarters by the largest seven.

Table B-22

DISTRIBUTION OF VENEER AND PLYWOOD CAPACITY IN BRITISH COLUMBIA, 1975

controlling companies	number of mills	capacity	*share of provincial capacity*
		cunits/shift	*per cent*
Weldwood	5	616.0	*19.7*
Canadian Forest Products	3	449.8	*14.4*
MacMillan Bloedel	2	370.0	*11.8*
Crown Zellerbach	3	282.6	*9.0*
North Central Plywood	1	227.3	*7.3*
Merrill & Wagner	1	206.0	*6.6*
B.C. Forest Products	3	190.0	*6.1*
Evans Products	2	166.5	*5.3*
Integrated Wood Products	1	143.0	*4.6*
McBride Plywood	1	94.3	*3.0*
Victoria Plywood	1	90.0	*2.9*
Crestbrook	1	81.0	*2.6*
B.C. Cellulose	1	70.0	*2.2*
Federated Co-op	1	57.0	*1.8*
Hedberg Veneer	1	44.3	*1.4*
Richmond Plywood	1	40.0	*1.3*
total	28	3,127.8	*100.0*

Source: Compiled from data obtained from the B.C. Forest Service.

Little new veneer and plywood capacity has been built on the Coast during the past decade. Moreover, capacity has not been fully utilized in the last few years and it is expected that production will decline in the future.[12] The expansion of the veneer and plywood industry into the Interior was facilitated by developments in the technology of peeling small logs. As a result, the new mills built in the Interior are more highly specialized and capital intensive, and are reported to achieve lower manufacturing costs and a more satisfactory level of profitability than those on the Coast.

INTER-SECTORAL INTEGRATION

The preceding review of each sector of the forest industry reveals a high and increasing degree of concentration of control. To complete this review, it is necessary to examine the inter-sectoral integration between control of timber rights and control of manufacturing capacity and the relationship between control of manufacturing capacity and the organization of product marketing arrangements.

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[12] A similar pattern has already emerged in Washington State, where several plywood plants have closed.

DISTRIBUTION OF TIMBER RIGHTS AND MANUFACTURING CAPACITY AMONG THE LARGEST CONTROLLING COMPANIES

controlling company	rights to timber and forest land: committed allowable annual cut	rights to timber and forest land: acreage of Crown-granted land outside Tree-farm Licences[1]	rights to timber and forest land: acreage of old temporary tenures outside Tree-farm Licences	manufacturing capacity: lumber	manufacturing capacity: pulp	manufacturing capacity: paper	manufacturing capacity: plywood and veneer
	per cent of provincial total						
MacMillan Bloedel	12.8	24.8	23.2	7.2	28.4	56.6	11.8
B.C. Forest Products	8.8	4.4	6.0	6.4	11.5	12.2	6.1
B.C. Cellulose	8.1	.2	—	3.1	10.4	4.9	2.2
Canadian Forest Products	5.7	.2	6.8	3.6	10.9	5.1	14.4
Northwood	5.2	.4	1.4	4.3	4.4	—	—
Crown Zellerbach	4.5	8.0	26.8	3.4	5.5	15.2	9.0
Rayonier	4.2	2.4	3.7	1.8	5.5	—	—
Weldwood	3.6	2.2	4.3	3.4	4.1	—	19.7
Eurocan	3.3	—	—	.3	5.0	—	—
Tahsis	2.4	—	3.6	1.3	4.1	—	—
Cattermole/Finlay	2.2	—	—	1.1	.8	—	—
West Fraser	2.0	—	—	2.2	—	—	—
Netherlands	2.0	—	—	1.9	—	—	—
Evans Products	2.0	—	3.7	1.9	—	—	5.3
Weyerhaeuser	1.6	.2	3.6	2.2	6.8	—	—
Triangle Pacific	1.4	—	—	1.9	—	—	—
Crestbrook	1.4	1.8	.1	1.6	2.2	—	2.6
Bay Forest Products	1.1	—	—	.9	—	—	—
Integrated Wood Products	1.1	—	—	.8	—	—	4.6
The Pas Lumber	1.1	—	—	.5	—	—	—
Pope & Talbot	1.0	.2	—	1.1	—	—	—
Merrill & Wagner	.9	—	—	.5	—	—	6.6
Whonnock	.9	—	—	1.3	—	—	—
Carrier Lumber	.8	—	—	1.0	—	—	—
Clearwater Timber	.8	.2	—	.8	—	—	—
North Central Plywood	.7	—	—	—	—	—	7.3
Babine Forest Products	.7	—	—	.9	—	—	—
Scott Paper	—	4.3	—	—	.4	2.4	—
Pacific Logging	.4	15.3	3.3	.4	—	—	—
	80.7	64.6	86.5	55.8	100.0	96.4[2]	89.6

[1] Includes Taxation Tree Farms outside Tree-farm Licences.

[2] Remaining 3.6 per cent is held by Belkin Packaging.

Source: Compiled from previous tables.

INTEGRATION BETWEEN FORESTRY AND MANUFACTURING

There is a high degree of both horizontal and vertical integration among the major companies involved in the B.C. forest industry. When the relatively small number of large controlling companies in each sector are compared, it emerges that they are often the same, indicating that industrial concentration is linked with integration. In each sector, numerous small firms account for a relatively modest share of control, and these also show less integration.

Table B-23 shows that 29 controlling companies dominate the forest industry in British Columbia. They account for 81 per cent of committed allowable harvesting rights, 65 per cent of the acreage of Crown-granted forest land outside Tree-farm Licences, and 85 per cent of the acreage of old temporary tenures outside Tree-farm Licences. With respect to the manufacturing sectors, these 29 firms account for 56 per cent of lumber capacity, 100 per cent of pulp, 96 per cent of paper, and 90 per cent of veneer and plywood capacity.

Even within this small group, control of timber rights and manufacturing capacity is rather concentrated. The first eight controlling companies—MacMillan Bloedel, B.C. Forest Products, B.C. Cellulose, Canadian Forest Products, Northwood, Crown Zellerbach, Rayonier, and Weldwood—stand out by virtue of their size and their involvement in each sector. Four other controlling companies—Eurocan, Tahsis, Weyerhaeuser, and Crestbrook—although not consecutively the largest, are similar insofar as they control significant pulp capacity as well as participate in most sectors of the industry. The combined control of this dozen broadly integrated controlling companies is shown in Table B-24.

Table B-24

CONTROL OF TIMBER RIGHTS AND MANUFACTURING CAPACITY BY THE MAJOR CONTROLLING COMPANIES

controlling companies	timber rights: committed allowable annual cut	timber rights: Crown-granted forest land outside Tree-farm Licences	timber rights: old temporary tenures outside Tree-farm Licences	manufacturing capacity: lumber	manufacturing capacity: pulp	manufacturing capacity: paper	manufacturing capacity: veneer and plywood
	per cent of provincial total						
largest 8	53	43	71	33	81	89	63
12 broadly integrated	62	45	78	39	99	89	66

Source: Table B-23.

INTEGRATION BETWEEN MANUFACTURING AND MARKETING

Manufacturing and marketing of forest products are very closely integrated. Independent brokers and wholesalers handle a relatively small proportion of lumber sales, an even smaller proportion of veneer and plywood, and almost no pulp and paper.

Integration between manufacturing and marketing occurs in three forms, *viz.:* direct ownership by manufacturing companies of major marketing divisions or agencies; partnership or contract selling by large companies for smaller ones; and financial ties between independent producers, and brokers or wholesalers. The first two forms are exemplified by the four large sales groups in British Columbia—MacMillan Bloedel, Seaboard, Eacom, and

Northwood—which combine the features of own-product selling, contract selling, and partnership selling. The third form of integration exists between several large independent sawmills and brokers or wholesalers who extend financing to the mills in return for commitments of production to be sold through the broker.

Pulp and paper marketing is almost completely integrated in producing companies. Because of the large volume of production which must be marketed on a continuous basis, and the contractual nature of most sales, most companies appear to find it advantageous to act for themselves in customer service and product promotion. The importance of marketing links for producers is apparent in the choice of partners for joint ventures.

The domestic plywood market is protected by tariffs and there are relatively few producers, which encourages companies to handle their own sales and product promotion or, in the case of small producers, to associate themselves with larger companies. Local sales, which account for only about 10 per cent of production, provide the only significant scope for independent marketing. Overseas sales of plywood depend heavily on the large lumber and building products selling organizations.

Integration between manufacturing and marketing is least in lumber and some building products, but own-product or partnership and contract sales remain dominant. The overland rail and truck market for lumber is a free and competitive market accessible to non-integrated companies, and is heavily relied upon by Interior lumber producers. Even the large integrated companies with their own sales organizations often sell to independent brokers operating in this market.

There are undoubtedly substantial economies of scale in shipping and marketing in overseas markets, and large volumes must be assembled and shipped to achieve minimum costs. Only the largest companies can achieve these economies independently; for others, co-operative sales organizations provide the needed scale of operations.

FOREIGN OWNERSHIP

To investigate the extent of foreign participation in the province's forest industry it is necessary to adopt consistent criteria for measuring foreign ownership and control. Here, because of the exigencies of data, the simplest possible measures are adopted, relying on the ownership of voting stock by non-residents of Canada.[13] Companies are assumed to be controlled by foreigners where non-residents own more than 50 per cent of their outstanding voting shares. The nationality of members of Boards of Directors provides some supplementary data.[14]

FOREIGN CONTROL OF COMPANIES

In the analysis of industry structure, 250 controlling companies were identified as holding significant timber rights or significant manufacturing capacity in the province. This is not an exhaustive list, but those omitted account for an almost insignificant share of capacity and production. Insofar as the analysis of foreign ownership is concerned, it can reasonably be assumed that the companies which have not been individually identified are domestically owned.

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[13] Relevant data on the nationality of shareholders of most companies have been obtained from *Reports* under the Corporations and Labour Unions Returns Act. Additional information has been provided by the B.C. Forest Service and by individual companies.

[14] Data on the nationality of directors is provided in *The Financial Post Directory of Directors, 1975*, the Financial Post Publishing Company, Toronto, 1975.

To consistently classify companies according to their degree of foreign ownership, it has been necessary to treat separately the individual firms included within four of the controlling companies because the proportion of foreign ownership varies among them. This added five additional companies to the list, so that the ownership of 255 controlling companies or individual companies was considered. Of these, 213 are entirely domestically owned. The remaining 42 are classified according to their proportion of foreign ownership in Table B-25.

Of the 42 controlling companies or firms which are not entirely owned by residents of Canada, 15 are entirely foreign owned. Of the remaining 27, foreigners have a majority interest in 14 and Canadians a majority interest in 13.

Table B-25

THE DEGREE OF FOREIGN OWNERSHIP OF COMPANIES NOT ENTIRELY OWNED BY RESIDENTS OF CANADA

degree of foreign ownership	number of companies	controlling company or companies	
per cent			
100	15	Bell Pole Co.	Pope & Talbot
		Canyon Creek	Q.C. Timber (C. Itoh)
		Darkwoods Forestry	Rayonier
		Eurocan	Swanson
		Evans Products	Tahsis
		Merrill & Wagner	Triangle Pacific
		Netherlands	Weyerhaeuser
		The Pas Lumber	
75–99	6	Crown Zellerbach	Peace Wood Products
		CIPA Lumber (C. Itoh)	Prince Rupert Forest Products
		MacGillis & Gibbs	Weldwood
51–74	8	Babine Forest Products	Intercontinental Pulp
		Crestbrook	Mayo
		Crows Nest Industries	Scott Paper
		Fraser Lake/Fort Fraser	West Fraser
50	2	Prince George Pulp	Northwood[1]
26–49	1	B.C. Forest Products	
1–25	10	Canadian Cellulose	MacMillan Bloedel
		Domtar	Price Skeena
		Finlay	Revelstoke
		Helco	Richmond Plywood
		Kitwanga	Victoria Plywood

[1] Northwood Mills and Northwood Properties, two of the firms elsewhere included in the Northwood group, are entirely Canadian by the definitions used here. Included above are Northwood's main operating companies: Northwood Pulp, Northwood Timber, and Northwood Pulp and Paper.

Source: Compiled from data obtained from Statistics Canada; reports under the Corporations and Labour Unions Returns Act; B.C. Forest Service and individual companies.

Table B-26

HOLDINGS OF RIGHTS TO TIMBER AND MANUFACTURING CAPACITY OF COMPANIES WITH MAJORITY FOREIGN OWNERSHIP

companies	rights to timber and forest land: committed allowable annual cut	rights to timber and forest land: acreage of Crown-granted land outside Tree-farm Licences[1]	rights to timber and forest land: acreage of old temporary tenures outside Tree-farm Licences	manufacturing capacity: lumber	manufacturing capacity: pulp	manufacturing capacity: paper	manufacturing capacity: veneer and plywood
	per cent of provincial total						
Crown Zellerbach	4.5	8.0	26.8	3.4	5.5	15.2	9.0
Rayonier	4.2	2.4	3.7	1.8	5.5	—	—
Weldwood	3.6	2.2	4.3	3.4	4.1	—	19.7
Eurocan	3.3	—	—	.3	5.0	—	—
Tahsis	2.4	—	3.6	1.3	4.1	—	—
West Fraser	2.0	—	—	2.2	—	—	—
Netherlands	2.0	—	—	1.9	—	—	—
Evans Products	2.0	—	3.7	1.9	—	—	5.3
Weyerhaeuser	1.6	.2	3.6	2.2	6.8	—	—
Triangle Pacific	1.4	—	—	1.9	—	—	—
Crestbrook	1.4	1.8	.1	1.6	2.2	—	2.6
The Pas Lumber	1.1	—	—	.5	—	—	—
Pope & Talbot	1.0	.2	—	1.1	—	—	—
Merrill & Wagner	.9	—	—	.5	—	—	6.6
Babine Forest Products	.7	—	—	.9	—	—	—
Fraser Lake/Fort Fraser	.5	—	—	.5	—	—	—
Crows Nest Industries	.4	12.5	.3	.7	—	—	—
Swanson	.3	—	—	.4	—	—	—
Mayo	.3	—	—	.4	—	—	—
Canyon Creek	.3	—	—	.3	—	—	—
Bell Pole Co.	.2	—	.2	—	—	—	—
Prince Rupert Forest Products	.2	—	.3	.3	—	—	—
Q.C. Timber, CIPA Lumber (C. Itoh)	.1	—	—	1.6	—	—	—
MacGillis & Gibbs	.1	—	.2	—	—	—	—
Scott Paper	—	4.3	—	—	.4	2.4	—
Darkwoods Forestry	—	7.1	—	—	—	—	—
Intercontinental Pulp[2]	—	—	—	—	3.8	—	—
	34.5	38.7	46.8	29.1	37.4	17.6	43.2

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[1] Includes forest land contained in Taxation Tree Farms outside Tree-farm Licences.

[2] Elsewhere considered part of Canadian Forest Products, but included here as it is 65 per cent foreign owned.

Source: See Table B-25.

Foreign Ownership of Timber Rights

Of the 29 companies with majority foreign ownership, 26 hold significant timber rights, as indicated in Table B-26. These companies control just over one-third of the committed allowable annual cut in both Public Sustained Yield Units and Tree-farm Licences, 38.7 per cent of the acreage of Crown-granted forest land outside Tree-farm Licences, and 46.8 per cent of the total acreage of old temporary tenures outside Tree-farm Licences.

A comparison of Table B-26 with Table B-9 (in which the regulated timber position of 75 companies is portrayed) reveals that the 5 largest controlling companies in the province have majority Canadian ownership (although there is minority foreign ownership in 4 of them). Among the next largest, foreign controlled companies dominate; 14 of the next 17 companies in Table B-9 have majority foreign ownership. Thus, while the foreign owned companies are not the largest in terms of control over regulated timber, they are relatively large companies and clearly dominate the top twenty.

Foreign Ownership of Manufacturing Capacity

Foreign control of manufacturing capacity is in roughly the same proportion as timber rights, as Table B-26 shows. Companies with majority foreign ownership hold 29 per cent of sawmilling capacity, 37 per cent of pulp but only 18 per cent of paper capacity, and 43 per cent of veneer and plywood capacity.

APPENDIX C

TAXATION OF FOREST LAND*

The main sources of public revenue from forest resources in British Columbia are stumpage and royalty charges on timber harvested. All stumpage and most royalty is levied on Crown timber, where these payments represent the public landlord's selling price for the timber, and the means of recouping the public's financial interest in forest resources. But apart from these provisions for recovering the Crown's equity in timber when it is harvested, the government levies a variety of other charges on those who hold rights to timber and forest land, most of which are reviewed in Chapter 13. The most important of these are property taxes, and the property tax system as it applies to forest land and timber is the subject of this Appendix.

Because of the large inventory of timber that must be carried for continuous forestry, and the extensive land base it occupies, property taxes have special significance in the forest economy. This Appendix provides a general description of the application of various property taxes to forest resources outside municipalities in British Columbia, but it is not a precise legal documentation with the degree of detail and qualification that would entail. This is followed, in the second part of the Appendix, by an examination of some of the economic implications of these taxes.

PROPERTY TAXES IN RURAL AREAS

The most important property taxes that bear on forest land[1] and timber in British Columbia are the provincial property tax and the schools tax, but there are also several minor forms levied for special purposes. Each is imposed under special statutory authority and at rates determined by different agencies, often subject to general provincial government approval. The following review is restricted to those taxes that apply to forest land in rural areas, since only a very small amount of taxable forest land lies within municipalities, and in none does forest land form an important part of the tax base.

Taxes change frequently, and major reforms in real property taxation in British Columbia are currently underway following the replacement of the Assessment Equalization Act[2] with the new Assessment Act.[3] Except where noted otherwise, the following review describes the property tax arrangements that obtained in the 1974 taxation year. Because forest land assessments were frozen at the 1974 level (apart from changes due to new inventory information or revised Taxation Tree Farm plans) this description generally applies to later years as well.

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* This Appendix draws heavily on *Taxes and Miscellaneous Levies on Forest Resources in British Columbia,* Policy Background Paper produced by this Commission, Victoria, 1975, 76 pp.

[1] Except where specifically indicated otherwise, the term "forest land" is used in this review to refer generally to land that contributes to forest production, and should not be identified with the special (and varying) statutory definitions of the term. Where the term refers to the land class of that name under the Taxation Act it is printed in italics.

[2] Assessment Equalization Act, R.S.B.C. 1960, c. 18 (as amended); Assessment Equalization Act Amendment Act, 1973, S.B.C. 1973, c. 5.

[3] Assessment Act, S.B.C. 1974, c. 6. This statute was proclaimed to be in force on July 2, 1974.

PROVINCIAL PROPERTY TAXES

Provincial property taxes are levied under the Taxation Act,[4] which applies to rural areas—the 99 per cent of the land area of British Columbia that lies outside municipalities. Revenues generated by these taxes accrue to the province's general fund. The yield does not constitute a large portion of total provincial revenue, nor is it large in comparison with some other charges on forest resources. The provisions of the Taxation Act are important, however, because many other tax statutes adopt them for assessment and collection purposes. This Act, in turn, defers to the Assessment Act[5] for determination of assessed values.

Liability. The provincial property tax falls mainly on Crown-granted lands, exempting property held by municipalities and by the provincial and federal governments (including Indian lands).[6] The main exception to the general exemption of Crown land is the so-called old temporary tenures—Timber Leases, Pulp Leases, Timber Licences, Pulp Licences, and Timber Berths—under which rights were originally conveyed several decades ago to harvest the timber subject only to payment of statutory royalty (rather than stumpage, which applies to other Crown tenures). The Taxation Act places these lands in a special category, defined as *forest land* and makes them liable to tax at one per cent of assessed value.[7] Those that are included within Tree-farm Licences are exempted, however, and this provision removes liability from more than half the total acreage of old temporary tenures currently held.[8]

Crown-granted forest lands are classified into several categories under the Taxation Act and the basis of assessment and the rate of tax varies among the classes. The principal features of each category are as follows:[9]

Timber land is land held for forestry purposes and currently supports a minimum average volume of merchantable timber, namely 8,000 board feet per acre on the Coast, and 5,000 in the Interior.

Tree-farm land is land for which the highest economic use is deemed to be forestry and is managed as a Taxation Tree Farm according to a sustained yield working plan approved by the Forest Service.[10]

Wild land is land in lots greater than five acres that does not fall into the preceding categories, or any non-forest category (such as farm land), and does not contain substantial improvements (generally speaking, with improvements worth less than an average of $2.50 per acre on the Coast or $1.25 per acre in the Interior).

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[4] R.S.B.C. 1960, c. 376 (as amended); land and improvements lying within municipalities are exempted by s. 24(a).

[5] *Op. cit.*

[6] Taxation Act, R.S.B.C. 1960, c. 376, s. 24(i).

[7] *Ibid.*, ss. 2, 50(1)((a).

[8] *Ibid.*, s. 24(n). This tax is examined in more detail in *Task Force 1st Report, 1974*, pp. 30–31, which deals specifically with charges on the old temporary tenures, and which recommends that this tax be abolished if other recommendations relating to royalty assessments are adopted.

[9] For precise definitions and restrictions, see Taxation Act, *op. cit.*, s. 2.

[10] See Appendix A.

Improved land is the residual class, comprised of lands that do not fall under any of the above categories or into any other class.

The total areas of forest land in each of these land classes and the parts carrying mature timber are shown in Chapter 13, Table 13-3.

Timber is assessed and taxed as part of the land, rather than as an improvement. Improvements on a parcel of land may determine its classification, but are assessed separately. Moreover, the rate of tax on privately owned improvements is independent of whether the land on which they are situated is under Crown or private title. The only relevant privately owned improvements exempt from tax are those that ". . . are designed to facilitate the management and the operation of and the growing and harvesting of wood . . ." on Taxation Tree Farms.[11] A corresponding exemption for such improvements on Tree-farm Licences was repealed late in 1974,[12] so the tax revenues indicated in Table C-2 for 1975 reflect this change.

Roads are a major category of improvements on forest lands. Almost all forest operations today depend on road access, and road requirements tend to grow as operations progress outwards from settled areas and established transportation routes. Forest roads located on Crown land are generally regarded as private property for tax purposes, unless they are built at government expense directly, or indirectly through offsets against stumpage assessments.[13] Such roads continue to be liable to tax as long as they remain in use.

Assessment. Where market transactions provide sufficient guidance, assessors of the British Columbia Assessment Authority estimate the value of forest land (other than *tree-farm land*) from the sale prices of properties with similar characteristics. Such sale prices can, of course, be expected to reflect royalty payable on the timber, annual property tax liability, and any private non-forest values of the land.

Where market information for comparable lands is lacking, the land and timber values are estimated separately and then combined. The average stumpage rates levied during the preceding year on Crown timber in the region provide the base for estimating the value of each species of timber, and this is applied to cruise information for the assessed land after appropriate adjustments for the characteristics of the property and any royalty payable are made. To this timber value is added a bare land value estimated from local sales, or, in its absence, a nominal land value.

It is important to note that assessed values reflect the royalty liability on timber, whether the estimate is based on sale prices of comparable land and timber or on current stumpage data. But the effect of property tax liability on timber value is taken into account only if local sales data are used; no allowance is made if the timber value is determined from comparable stumpage prices. Non-forest values are also reflected in land assessments only where local sale prices are used for guidance. Where nominal land values are used, these cannot be expected to account for differences in property tax liability and non-forest values. They are employed only where no transactions in land occur, and in most such cases values other than forestry are of little consequence.

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[11] Taxation Act, *op. cit.*, s. 24(t).

[12] Forest Act, R.S.B.C. 1960, c. 153 (as amended), s. 36(21), repealed by Statute Law Amendment Act, 1974 (No. 2), S.B.C. 1974, c. 114, s. 5(a).

[13] Forest Amendment Act, 1974, S.B.C. 1974, c. 36, ss. 5, 9(a) (which amended ss. 17 and 36(20) of the Forest Act), provides that where the Crown finances construction of a primary access road either by payment in cash or offset against stumpage, the road vests in the Crown. The effect of this measure is to eliminate from liability for property tax many roads built on Crown land by Tree-farm Licensees, and by Timber Sale and Timber Sale Harvesting Licensees. (See also Chapter 12.)

Tree-farm land is evaluated by a special procedure. It is designed to provide a fiscal incentive for private forest land owners to practise sustained yield forestry by having their lands classified as Taxation Tree Farms. To qualify for this classification, the land's best economic use must be deemed to lie in forest production and the owner must undertake to manage it according to a sustained yield plan approved by the Forest Service. The value of such land is the calculated present (discounted) value of the future net revenues that the entire unit can be expected to yield under the approved plan. Stumpage values are estimated from current Forest Service appraisals in the same region, with deductions for any royalty payable and for costs incurred in managing the land. Future expected stumpage values are discounted at 14 per cent per year—a rate which is intended to allow for annual property taxes as well as a reasonable rate of return on the forest investment.

The preferential tax treatment afforded to owners of *tree-farm land* does not take the form of a lower tax rate but rather the lower estimates of property value that result from the above procedure. In the first place, it precludes any recognition of non-forest values, which is important because some of this land is located in relatively well-developed areas. In the second place, instead of evaluating all mature timber as if it were to be harvested immediately, it discounts that value at a substantial rate over varying numbers of years according to the planned time pattern of future harvests under the approved plan.

The above procedures describe how the full or "actual value" of land and timber is determined for tax purposes. For *tree-farm land* this actual value becomes the tax base or "assessed value". For other classes of land, the Taxation Act[14] until 1974 deferred to the Assessment Equalization Act for the definition of assessed value, with the result that assessed value has been determined at 50 per cent of actual value. The Assessment Act,[15] which replaced the Assessment Equalization Act, requires (with some exceptions) that assessed values reflect full actual values. However, the Assessment Amendment Act requires that assessed values remain at the same levels as those prevailing in 1974 under the repealed legislation.[16] This limitation will continue until further statutory amendment.

The assessed value of improvements in the past has been set at 50 per cent of their actual value under the Assessment Equalization Act and this rate is also frozen in the 1974 legislation.[17] Improvements are taxed on only 75 per cent of their assessed value.[18] In short, through this somewhat circuitous set of definitions, the taxable value of improvements is 37.5 per cent of their estimated actual value.

The provincial property tax is levied on the assessed value of forest land at rates that vary between 1 and 3 per cent depending upon its classification, and on 75 per cent of the assessed value of improvements at the improved land tax rate of 1 per cent. These rates, and the relationship between actual values and taxable values for each class, are summarized in Table C-1.

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[14] *Op. cit.*, s. 31.
[15] *Op. cit.*, s. 24.
[16] Assessment Amendment Act, S.B.C. 1974, c. 105, s. 1.
[17] *Ibid.*
[18] Taxation Act, *op. cit.*, s. 50(1).

Assessments are made by the Assessor in each of the 27 Assessment Districts in the province, and the taxes are levied and collected by the Surveyor of Taxes in the Department of Finance. Total tax yields are indicated in Table C-2.

TABLE C-1

SUMMARY OF TAXABLE VALUES AND TAX RATES FOR PROVINCIAL PROPERTY TAX

Land class[1]	taxable value[2] per cent of actual value	tax rate[3] per cent
forest land	50	1
timber land	50	1½
tree-farm land	100	1
wild land	50	3
improved land	50	1
Improvements	37.5	1

[1] As defined in the Taxation Act, s. 2.
[2] See text for explanation.
[3] Taxation Act, s. 50.

SCHOOLS TAX

Revenues to finance part of the cost of public schools are raised by a separate tax levied under the Public Schools Act.[19] The 75 School Districts, which cover most of the province, levy the tax at varying rates, and for rural properties schools taxes are collected, in conjunction with the provincial property tax by the Surveyor of Taxes.[20] The regulations governing assessment, levy, and collection of provincial property tax set out in the Taxation and Assessment Acts apply also to the schools tax in rural areas.

Liability. Liability for the schools tax in rural areas differs in some respects from that of the provincial property tax, and the most important differences for forest properties are:

i) The Crown land held under old temporary tenures outside Tree-farm Licences, which is subject to provincial property tax as *forest land,* is exempt from the schools tax.

ii) Improvements designed to facilitate forest management on Taxation Tree Farms are exempt from the provincial property tax, but are liable to the schools tax, as are similar improvements on Tree-farm Licences.[21]

iii) The Assessment Act provides the definition of improvements for schools tax purposes and includes items such as machinery, which can be regarded as the personal property of a tenant and removable by him.[22] These items are specifically excluded from the definition of improvements in the Taxation Act and are thus exempt from provincial property tax. This difference results in much higher schools tax assessments for improvements, but makes no difference for the various forest land classes (see Table C-2).

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[19] R.S.B.C. 1960, c. 319 (as amended), ss. 198–211.

[20] A small amount of taxable property falls outside any School District and is therefore taxed directly by the provincial government. The total assessed value of such property, however, is well under half a million dollars. In municipalities, the Municipal Act, R.S.B.C. 1960, c. 255 (as amended) and the Vancouver Charter, S.B.C. 1953, c. 55 (as amended) govern the administration of taxes.

[21] Public Schools Act, *op. cit.*, s. 207(d). In 1974 Section 36(21) of the Forest Act, which had exempted from property tax similar improvements on Tree-farm Licences, was repealed: Statute Law Amendment Act, 1974 (2nd), S.B.C. 1974, c. 114, s. 5(a).

[22] Assessment Act, S.B.C. 1974, c. 151 (as amended), s. 1.

As a result of these differences, all Crown land is exempt from the schools tax; all private land is subject to tax with the same assessed values as for provincial property tax purposes; and all privately owned improvements are subject to the schools tax, encompassing a significantly wider range of improvements than is covered by the provincial property tax.

Determination of rates. The schools tax rates set by the individual School Districts are the result of school financing arrangements in British Columbia.[23] Costs for a basic instructional programme throughout the province are determined and, in the light of these and other factors, the provincial Cabinet sets a cost figure for a basic instructional unit and a basic mill rate for school purposes. The basic rate was 24.7 mills in 1973 and 1974, 25.7 mills in 1975, and 32.5 mills has been set for 1976.[24] The basic grant made to any particular School District is the difference between the cost for the basic educational programme in the District (calculated using the Cabinet's province-wide cost figure per instructional unit and including the cost of essential expenses for auxiliary services) and the amount raised by the basic rate applied to the District's assessment base.[25]

The basic cost and mill rate figures set by the Cabinet effectively determine the amount of the basic grants, and hence the sharing of educational costs between the province and the local School Districts. Districts with small assessment bases relative to local educational requirements will receive large grants, and vice versa. Under a 1973 statutory amendment,[26] Districts for whom the basic grant as calculated would be negative must contribute this amount to finance the basic grants to other Districts whose grant will be positive.

In addition to basic grants, School Districts receive grants in aid of capital expenditures which the Minister of Education determines to be eligible for such assistance.[27] Districts must bear 50 per cent of such costs to the extent that this can be done with a local levy of up to 3 mills, 25 per cent of additional costs up to a further levy of 1½ mills, and 10 per cent of any amount beyond that. The province provides capital grants to cover the rest. In addition to these basic and capital grants, the provincial government may grant such special aid to any School District as it sees fit.

The result of all these arrangements[28] is that the mill rate set by each School District is the sum of the basic rate plus amounts to cover the following:

i) the difference between the District's cost for the basic instructional programme and the unit cost set by the Cabinet (this may be positive or negative);

ii) the cost of education in excess of the basic instructional programme; and

iii) the District's share of capital costs.

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[23] Set out in the Public Schools Act, *op. cit.*, ss. 180–211.

[24] This rate applies to areas outside School Districts and the revenues are used to finance basic grants.

[25] Until 1975 for purposes of these calculations, the assessment base was adjusted for consistency under the Assessment Equalization Act, *op. cit.* The new Assessment Act, *op. cit.*, centralizes assessments into one Assessment Authority which could make such adjustments internally.

[26] Public Schools Amendment Act, 1973, S.B.C. 1973, c. 142, s. 32, amending s. 201.

[27] Public Schools Act, *op. cit.*, s. 183.

[28] The above description portrays only the basic framework: the actual procedure is, of course, considerably more complicated.

In 1974 the schools tax rate applied to forest lands ranged from about 26 to 41 mills among different School Districts. By 1976 rates had increased to the point where most forest land faced school levies of between 41 and 51 mills.

Ignoring improvements and isolating schools taxes raised from forest land (including timber) alone places the relative importance of timber values in the total scheme of School District financing in fiscal perspective. These levies in 1974 contributed slightly less than one per cent of School District budgets, and roughly three per cent of the amount raised locally (net of provincial government grants to the Districts and to home owners).

Such aggregate figures can be misleading, however, insofar as they hide the heavier reliance placed upon forest land assessments by certain Districts. While they represent an average of only two per cent of the total provincial assessment base of the combined rural and municipal parts of all 75 School Districts, forest land assessments account for over five per cent in 10 Districts and in three of these they account for more than 15 per cent.[29] In the most extreme case forest lands constitute roughly 60 per cent of the entire schools tax assessment for one District.

OTHER PROPERTY TAXES

In addition to provincial property tax and schools tax, a large variety of other taxes are applied to rural property to provide revenue for special purposes.[30] For these purposes, specific areas of the province have been designated, and here we describe the most significant of these.

Regional Districts and Hospital Districts constituted under the Municipal Act[31] and Regional Hospital Districts' Act[32] respectively cover the whole province, while Improvement Districts and water-users' communities have been established under the Water Act[33] and Municipal Act[34] where a particular need has arisen. The Department of Finance levies and collects the taxes on rural property on behalf of most of these districts,[35] and wherever this is the case the tax base is the same as the schools tax base, except where a special statutory exemption applies.[36]

Regional Districts Tax. The Regional Districts in the province provide a considerable variety of services, and participation in the provision of these services varies both among Districts and among areas within Districts. In each District, the cost of each service is apportioned among the participating municipalities and (outside municipalities) electoral areas in proportion to the schools tax base in each.[37] The costs attributed to areas outside municipalities are covered by an advance from the provincial government and subsequently recovered by a levy on the schools tax base.

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[29] Based on 1974 Preliminary School District Rural Assessment figures.

[30] For an extensive list, see *Comments of Surveyor of Taxes to Select Standing Committee on Municipal Matters Concerning Real Property Taxation in Rural Areas of British Columbia,* September, 1974, p. 7.

[31] R.S.B.C. 1960, c. 255 (as amended), ss. 765–798FA.

[32] R.S.B.C. 1967, c. 43 (as amended).

[33] R.S.B.C. 1960, c. 405, ss. 53–88.

[34] *Op. cit.,* s. 798G, and see footnote 39 *infra.*

[35] Where these taxes are levied by the Department of Finance, funds are advanced under the various statutes and recorded in the Department's appropriations in the *Public Accounts of British Columbia.* The districts noted account for almost all of such advances.

[36] The most important exemption is that of the property of the B.C. Hydro and Power Authority. See *Comments of the Surveyor of Taxes . . ., op. cit.,* p. 7.

[37] Municipal Act, *op. cit.,* s. 782. For these purposes, the property of the B.C. Hydro and Power Authority is excluded.

The resulting levies on private forest land and improvements vary widely as a result of differences in the services provided among Regional Districts and differences in participation within Districts. In total, they amounted to slightly less than 5 per cent of the schools tax in the 1972–73 fiscal year.[38]

Hospitals Tax. Property taxes for hospital purposes are levied by the Department of Finance on behalf of Hospital Districts in those parts of Districts lying outside municipalities. As with Regional District taxes, the tax base is the same as that for the schools tax except for the exclusion of B.C. Hydro property. The rate of tax varies among Hospital Districts, but is uniform within each. Among Hospital Districts that contain some forest land, the rate varies widely. In 1972–73 the total revenue from the hospitals tax in rural areas averaged about 4.5 per cent of the schools tax revenue.

Local Improvements Tax. The Water Act[39] gives the provincial Cabinet powers to establish Improvement Districts for a wide variety of purposes (such as fire protection and water supply); and to finance their projects the Districts may collect taxes on a basis of their own choice. Where an Improvement District includes unorganized territory the District may elect to have the levy administered by the Assessor of the Assessment District which contains the largest part of the Improvement District.[40] This course is usually adopted, and the tax is levied by the Department of Finance using the schools tax assessment base and some of the procedures of the Taxation Act. The rate of tax varies considerably and many forest properties are not included in Improvement Districts.

SUMMARY OF PROPERTY TAXES

Table C-2 offers a summary of the yield of property taxes on rural lands and improvements that are valued primarily for forestry purposes.[41] These taxes accounted in 1975 for about one-fifth of all property taxes collected in the province outside municipalities. Figures such as these for a single year should be interpreted cautiously, however, since the assessed value of forest lands is very closely linked to stumpage values, which fluctuate widely with forest product markets.

During most of the last decade, total taxes on rural properties have increased at an average rate of more than 10 per cent per year although the year-to-year increase has varied from less than 5 to more than 20 per cent. Provincial property taxes and schools taxes had risen at about the same average rate until 1975, when schools taxes rose sharply and provincial property taxes fell slightly. The other property taxes have increased at an annual rate of over 20 per cent throughout the decade and by 30 per cent in 1975. The taxes paid on forestry-related properties have risen more slowly, at an average rate of about 6 per cent per year, although they have shown

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[38] The figure in 1971–72 was approximately 4 per cent. These, and corresponding percentages in subsequent paragraphs, are based on advances. Percentages based on collections should be roughly similar.

[39] *Op. cit.*, ss. 53–75. The Municipal Act, *op. cit.*, s. 798G incorporates these same provisions for areas within municipalities. Functions unrelated to water are increasingly being administered by the Department of Municipal Affairs under the Municipal Act.

[40] Water Act, *op. cit.*, s. 62(6).

[41] The special tax on timbered lands under the Esquimalt and Nanaimo Railway Belt Land Tax Act, R.S.B.C. 1960, c. 133 (as amended) is not dealt with here. It provided for a once-only tax of 25 per cent of the assessed value of such lands alienated from the railroad company after February 20th, 1946. Since all the relevant lands have now been alienated from the company this tax no longer applies, except insofar as some payments remain due from past sales.

Table C-2

PROPERTY TAXES LEVIED ON LANDS AND IMPROVEMENTS VALUED MAINLY FOR FORESTRY PURPOSES, 1975

	provincial property tax		schools tax		other property tax yields[2]	total tax yield
	taxable value[1]	tax yield	*taxable value*[1]	tax yield		
	thousands of dollars					
Lands valued mainly for forest growth:						
tree-farm land	*59,108*	591	*59,108*	2,415	497	3,503
timber land	*109,781*	1,647	*109,781*	4,521	1,028	7,195
wild land	*12,188*	366	*12,188*	478	107	951
total private lands	*181,077*	2,603	*181,077*	7,415	1,632	11,650
forest land	*98,078*	981	—	—	—	981
total forest lands	*279,155*	3,584	*181,077*	7,415	1,632	12,631
Forestry-related improvements:						
logging improvements	*52,127*	521	*57,794*	2,339	417	3,277
manufacturing (etc.) improvements	*49,349*	493	*111,651*	4,462	920	5,876
total forestry-related improvements	*101,476*	1,014	*169,445*	6,801	1,337	9,153
total forestry-related property	*380,631*	4,599	*350,522*	14,216	2,970	21,784
forestry as per cent of provincial total for rural property	*24.6*	*27.5*	*16.7*	*17.0*	*19.3*	*18.8*

[1] See text for definitions.

[2] Includes Regional District taxes, Hospital District taxes, and Improvement District taxes collected by the Department of Finance, thus excluding minor amounts levied by Districts themselves.

Source: Surveyor of Taxes, Department of Finance.

much wider year-to-year fluctuations. This difference in growth rates has resulted in a gradual decline in the proportion of property taxes drawn from forest properties.

Table C-2 indicates that 58 per cent of the property taxes borne by the forest industry in 1975 were derived from assessments on forest lands other than improved land. In that year, and in 1974, these yields were unusually high because in both cases assessments reflected high stumpage values in the preceding year. With some lag, a decline in stumpage values normally results in a decline in the fraction of forest property taxes derived from forest land and timber. Because of the assessment freeze applied to forest lands and extension of some municipal boundaries which removed improvements from rural areas, the reverse happened in 1975; this fraction rose despite a decrease in stumpage values. The fraction of total forestry-related property taxes accounted for by taxes on forest lands is significantly higher under the provincial property tax than under the schools and other taxes, because the latter employ a much broader definition of improvements and exclude the *forest land* category from the assessment base.

Of the $12.6 million in property taxes derived from forest lands (excluding improved lands) in 1975, the largest sources were *timber land* and *tree-farm land,* accounting for 57 and 28 per cent respectively. *Wild land* held for forestry purposes, and *forest land*—the old temporary tenures outside Tree-farm Licences—each contributed 8 per cent. The relative importance of *timber land* and *forest land* has not changed much during the last decade. The fraction of the total derived from *wild land* has doubled in recent years while that from *tree-farm land* has correspondingly declined.

The schools tax is easily the largest tax on forest lands, accounting for 59 per cent of the total in 1975 compared with the 28 per cent accounted for by the provincial property tax and the 13 per cent by the other property taxes levied by the Department of Finance. The provincial property tax share was quite stable during the last decade up to 1974, while the schools tax share declined by about one per cent per year and that of other taxes quadrupled. In 1975 the proportions for schools and other taxes jumped sharply with increases in their mill rates, occasioned in part by the assessment freeze, while a decline occurred in the proportion of the total going to the provincial property tax with its mill rates fixed by statute.

INTERDEPENDENCIES AMONG TAXES AND CHARGES

In the first part of this Appendix and in Chapter 13, the individual taxes and charges were described and the revenues from them compared as if each levy were independent of the rest. Certain of the charges examined above can indeed be considered in isolation: fixed annual rentals and fees, the forest protection tax (which is based on either acres of land or annual allowable harvest), and royalties that are independent of the value of the timber are not affected by other levies.[42] But some of the levies have important interrelationships, because one affects the base on which another is assessed.[43] Appraised stumpage and property taxes, in particular, are affected by other charges, since the base for each depends in part on other levies. These interdependencies are considered in this section by examining how an increase or decrease in one charge is offset by an opposite change in the yield of another.

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[42] It can be argued that by affecting the level of harvest that is economically feasible, a tax affects any charge based on the annual harvest. If this economic feasibility criterion were incorporated in the determination of allowable harvests, taxes based on allowable harvests would be affected. This sort of relationship depends on behaviour in response to a tax, and is more circuitous than the links considered here.

OFFSETS THROUGH PROPERTY TAXES

Charges of various kinds are offset through property taxes when they are recognized in determining the assessed value of the taxed lands. The property tax base for *timber land* is primarily the value of the timber on it, estimated from prevailing stumpage prices and reduced by the amount of any royalty payable upon harvesting. Timber on *forest land, wild land,* and *improved land* is evaluated in the same way for tax purposes (if it is evaluated separately from the land). In these cases, every dollar of royalty payable therefore reduces the estimated value of the timber by one dollar, and the assessed value by 50¢. For *timber land* this reduces annual taxes by about 2½¢.[44]

In a surprisingly short time such annual tax offsets associated with royalty liability accumulate to a value exceeding the royalty itself; in 17 years if the annual tax saving is capitalized at 10 per cent, or in 21 years at 6 per cent—both significantly shorter periods than the usual planned life of forest crops.

The total offset of royalties through property taxes on forest lands in the province depends on the amount of royalty payable and the rate of property taxation. Most of the *timber land, wild land,* and *improved land* noted in Table 13-2 is not subject to royalty, having been granted prior to 1887. For such lands granted between 1887 and 1914, royalties effected a reduction in property taxes on timber in 1974 in the order of 2 per cent, and on those granted since 1914, a reduction of about 9 per cent.[45] In years with stumpage values (and hence assessments) lower than the high levels prevailing in 1974, these fractions would be greater. The total dollar amount of this offset is relatively small, about $25,000 per year.

Tree-farm land, which comprises Taxation Tree Farms, is currently assessed for property tax as the present value of the net revenue it will yield if managed according to an approved forest management plan. Since royalty payable on harvest reduces the net revenue, it reduces assessed values proportionately. For each dollar of royalty a Taxation Tree Farm can be expected to yield annually, its assessed value is reduced by $7.14; and, at 1974 average rates of tax, this will reduce property taxes by about 35¢. Thus, for a Taxation Tree Farm in continuous production, about one-third of royalty payable is offset through reduced property taxes. As with *timber land,* the total amount of the offset, at about $60,000, is not large because most *tree-farm land* was granted before royalty was reserved to the Crown.[46]

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[43] As in the case of logging and income taxes, a dependency also arises when one tax is offset directly against another through a tax credit. This situation does not arise with the taxes and charges being considered here. For profitable operations all of these taxes and charges are offset to the extent of the rate of tax on corporate incomes, an effect which is also not discussed.

[44] Assuming assessed values equal to 50 per cent of actual value and a tax rate of 50 mills. The total of provincial property tax, schools tax, hospitals tax, and Regional Districts taxes averaged more than 50 mills for *timber land* in 1974. The mill rates for 1975 and 1976 were considerably more but these are seen as abnormal because of the freeze on assessments. If the requirement of the new Assessment Act that assessed value be increased to 100 per cent of actual values were implemented, the assessed value would be reduced by the full amount of the royalty and the annual tax reduction doubled.

[45] This latter number is based on the assumption that the average royalty payable on timber from all lands granted after 1914 is the same as the average paid on timber cut from these lands in 1973.

Timber on *forest land* is appraised for property taxes in much the same way as that on *timber land,* and hence taxes on these old temporary tenures are also reduced by royalty liability. The percentage reduction in property taxes payable on *forest land* in 1974 would have been about the same as the 9 per cent for *timber land* subject to the same royalty schedule. This implies that the offset of royalties through reduced property taxes would amount to about $90,000 per year. This is greater than the offsets on *timber* and *tree-farm land* (in spite of the lower rate of property tax on *forest land*) because the amount of timber on taxable old temporary tenures exceeds by a wide margin the timber subject to royalty on private lands. If the new legislation that permits royalties on these lands to be determined by appraisal is implemented, and if the royalty were set at the full appraised value of the timber, the present method of assessing it for property taxes would indicate a zero assessed value and, as a result, no tax liability whatsoever. Royalties would be offset to the full extent of the property tax through complete elimination of the tax base.

The tax base for *timber land* is primarily the current market value of the timber, and only something which reduces this value, like royalty payable upon harvest, will affect that base—carrying charges such as forest protection tax will not. In contrast, the tax base for *tree-farm land* is derived from the expected future stream of net revenues, and any charge that reduces net revenues through time affects the property tax base. As with royalty, each dollar of annual costs reduces annual property tax liability by about 35¢.[47] Thus, the forest protection tax on *tree-farm land,* of roughly $75,000 per year, causes property taxes on these lands to be approximately $25,000 less than they would be otherwise.

OFFSET THROUGH STUMPAGE

The Forest Service appraisal system calculates stumpage as a residual; it is the amount remaining after the estimated costs of production are deducted from the value of the products derived from the timber stand. If this principle were followed precisely, all taxes and charges that must be paid by those who harvest Crown timber would be accounted for and fully offset in stumpage assessments. In practice, complete offset does not always occur, primarily for three reasons:

i) Stumpage rates are subject to minimum and, on the Coast, maximum limits; wherever the price is so constrained, changes in costs will not be fully reflected in the assessed stumpage.

ii) Allowances in appraisals for various taxes and charges are often imprecise. Being relatively small, they are generally included as part of the broader category of overhead costs and are not subjected to rigorous individual estimation, so that the allowances for them may not accurately reflect their actual magnitude.

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[46] This estimate is based on the assumption that the ratio of royalty payable to stumpage values on *tree-farm land* is equal to that on *timber land, wild land,* and *improved land* subject to the same royalty.

[47] How precisely this offset would operate depends on the manner in which the allowance for these costs is made in the valuation process.

iii) Some charges are based on large units of Crown timber holdings, not just on the timber currently harvested. As a result, it is not always clear which charges should be recognized in stumpage charged on the current harvest, and which should be regarded as a charge associated with the right to future timber supplies.

If stumpage charges fully reflected the net value of alienated timber,[48] these taxes and other charges would have to be fully allowed for—at least on an average basis—or harvesting would not be economically feasible. Any change in other charges would have to be matched by an equal and opposite change in stumpage assessments. To the extent that the stumpage system responds in this way, the issue is not the amount of revenue to be collected by the government but rather the division of it among various revenue devices.

Some Further Implications

These interdependencies among taxes and charges suggest how the revenue raised by some would change in response to a change in others or in the absence of others. Thus, while it is possible to present a straightforward account of the yield of the various levies, as in Table 13-1, it is nevertheless difficult to assess unambiguously the contribution of each to the public revenue, because the amount raised by one may reduce the yield of another. Similar complications attend estimates of the burden of individual levies on taxpayers.

These interdependencies also imply that the consequences for the taxpayer or for government revenues of a change in a particular levy cannot be assessed by considering that levy in isolation. Built-in offsetting effects within the complex system of taxes and charges must be accounted for if the impact of a change on total tax liability, or revenue and its distribution among taxing authorities, is to be determined. The policy issue therefore surrounds not only the question of how much revenue should be raised in total, but also how it is to be raised, with consideration being given to the effects of different kinds of charges on those paying them and to the revenue implications for different taxing bodies.

TAX BURDENS

The total yield of various taxes tells us little about the burden they impose on forest lands. This section examines the burdens associated with property taxes on the main categories of forest land, and their implications for the economic viability of commercial forestry on private land.

Stumpage, as shown earlier, is the predominant source of forest revenue, but the comparatively small annual yield of property taxes on forest land gives a misleading impression of their relative burden. Stumpage is paid on about 70 per cent of the annual harvest while the property tax revenue is raised on only a small fraction of the land and timber in the province. Moreover, stumpage is charged on a forest crop only once, whereas property taxes are levied every year.

Stumpage values, properly measured, indicate the gross return generated on land used in commercial forestry. Property tax liability must be regarded by a forest landowner as one of the costs associated with producing these values, along with management expenses and interest on his capital tied up in timber inventories. Taxes alone do not determine the profitability of a forest-growing enterprise, but they can have a significant effect over long periods of time. To assess the true burden of annual taxes it is therefore necessary to estimate their cumulative value and compare this with stumpage values at the time of harvest.

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[48] The government's intention to make stumpage charges reflect the full net value of timber may be inferred from the Terms of Reference given to the Task Force on Crown Timber Disposal. See *Task Force 2nd Report, 1974,* Appendix A.

The cumulative value of an annual charge depends upon the amount of the charge, the number of years over which it is cumulated, and the rate of interest at which the amounts are compounded. The rate of interest for this purpose should reflect the cost of capital to the forest landowner, but the appropriate rate for comparisons over long periods is not obvious. It is tempting to use some market rate but inflation, if it is significant, will distort market interest rates as well as other costs and product values. An alternative procedure is to use a "real" interest rate: that is, a rate that reflects the cost of capital after inflation has been allowed for. Recent studies suggest that such rates for Canada over recent decades have been about 6 per cent, after corporate taxes.[49] Nominal or market rates will have been higher by the amount of inflation. If a real rate of return is used for accumulating taxes, consistency requires that only changes in taxes or product values which diverge from the general rate of inflation be taken account of in the analysis.

Whatever the rate of interest appropriate for holders of forest land, the burden of taxes considered in this study can be calculated by comparing the expected stumpage value of the crop when it is to be harvested with the cumulated value of the taxes that must be paid on the crop until it is harvested.[50] Increases in the real value of timber over time can, of course, have the effect of reducing the effective tax burden. If a particular rate of increase in value is expected, this can be accommodated in the calculation of burden by reducing the rate of interest used to cumulate taxes by the rate of expected annual increase in the value of the crop.[51] In the United States, at least, stumpage values appear to have risen at an average annual rate of more than 3 per cent in real terms over the six decades prior to 1960.[52]

Two related points about the choice of interest rate should be emphasized at the outset: first, that there is some room for debate about the most appropriate rate; and second, that the results of calculations that encompass long periods (as is often the case with forestry problems) are highly sensitive to the rate selected. For example, one cent per year over 80 years cumulates to a value of 80 cents at an interest rate of zero (obviously); $1.94 at 2 per cent; $17.47 at 6 per cent; and $204.74 at 10 per cent. Each dollar of an annual amount increases these cumulative figures 100-fold.

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[49] See, for example, Glenn P. Jenkins, "The Measurement of Rates of Return and Taxation from Private Capital in Canada", in W. A. Niskanen *et al.* eds., *Benefit-Cost and Policy Analysis,* Aldine Publishing Co., Chicago, 1973; and John Helliwell *et al.* "The Supply Price of Capital in Macro-economic Models" in A. A. Powell and R. A. Williams, eds., *Econometric Studies of Macro and Monetary Relations,* North-Holland Publishing Co., New York, 1973.

[50] In practice, forest enterprises often regard taxes on forest properties as a current expense to be written off against current revenues from other parts of the enterprise, and thus do not explicitly consider the cumulating burden on each stand individually. Nevertheless, an analysis of the economic impact of annual taxes on the returns from a forest crop calls for a comparison of the kind described here.

[51] If the increase is due to timber growth or to increases in stumpage values relative to the general price level in the economy, the tax burden is genuinely reduced. However, if increased harvest values are simply a reflection of the general rate of inflation in the economy, such inflation should be reflected also in the interest rate employed, so the calculated burden will be the same as that which would be obtained using an appropriate real interest rate and deflated timber values in the calculation.

[52] *The Outlook for Timber in the United States,* Forest Service, U.S. Department of Agriculture, Forest Resource Report No. 20, October 1973, Table 2, page 332.

Thus, even relatively modest annual charges accumulate at moderate interest rates to enormous amounts over the long periods that are often involved in analysing forestry problems. To put this in perspective, the better forest sites can be expected to yield a crop with a stumpage value exceeding $1,000 per acre at current prices, and taxes on *timber land* averaged more than $9.00 per acre in 1974.[53] The annual charges considered in this paper can, therefore, involve a significant burden on the lands on which they are levied, in spite of their relative insignificance as sources of revenue. Because these charges vary among the forest land classes, their impacts on each class must be examined separately.

Timber land

The more than 600 thousand acres designated as *timber land* currently contain a volume of timber only slightly less than the total annual harvest of timber in the province, and about double the current harvest in the Vancouver Forest District, where some 90 per cent of this land is located. The financial implications of taxes for the practice of forestry and for the holding of mature timber on this land are therefore of some importance.

The issue of tax burdens on these lands can be cast in two relevant ways. One is the extent to which taxes levied annually on a forest crop over its life erode the final value of the crop. This focuses on the tax implications for the profitability of timber-growing. The other is the extent to which taxes absorb the value of mature timber held for future harvesting. These two issues will be examined in turn.

With respect to the first question a study published nearly two decades ago[54] revealed that growing a crop on land classified as *wild land* and subsequently as *timber land* was unlikely to be profitable. Even on very productive land, the cumulative weight of property tax over commonly accepted forest rotations would exceed the stumpage value. Since then, the effective rates of tax have risen by about one-third on immature timber and by nearly two-thirds on mature timber, so that today a similar calculation would not indicate improved financial feasibility.

With respect to the second question, an indication of the impact of taxes on the holding of timber inventories can be obtained by calculating the number of years over which cumulated taxes will rise to 100 per cent of the value of the timber. The taxes on *timber land* containing merchantable timber, assessed at the 1974 rate of 2¾ per cent of its value annually, will cumulate at 6 per cent interest to the full value of the crop in only 20 years.[55] The resulting incentive to harvest quickly is thus apparent.

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[53] The total of real property taxes on *timber land* divided by the total acreage in this category yields an average tax per acre of $9.44. Most of the assessed value was on land bearing valuable timber, so on that part of the total land in this class the average tax was considerably higher. For reasons noted earlier, assessments in 1974 were unusually high and they have remained in use for 1975 and 1976 as well.

[54] A. Milton Moore, *Forestry Tenures and Taxation in Canada*, Canadian Tax Foundation, Toronto, 1957, Chapter 17.

[55] The period over which annual taxes of 2¾% will accumulate to 100% is equivalent to the period required for 1% annually to grow to 36⅓% (i.e. 100% ÷ 2¾%) or for 1¢ per year to accumulate to 36⅓¢.

A number of important qualifications to these illustrative calculations should be made. First, it has been implicitly assumed that the land finds its highest use in timber production. If it does not, a tax that is capable of erasing the returns to the landowner who uses it for forestry purposes may hasten its transfer to a higher use.[56] Second, such calculations of financial feasibility are applicable only where the enterprise is restricted to timber production. Where timber is held to support a manufacturing facility, for example, taxes and other carrying costs should be seen in the broader context of capital costs associated with the whole enterprise, and in that case taxes on timber would be less critical in governing incentives to harvest the crop (although the tax burden on the forest land alone would be no different).

Third, if a higher than normal interest rate is called for—on grounds, say, of high risks in holding timber—the impact of taxes will be greater than implied above. At 10 per cent, for example, annual taxes of 2¾ per cent on merchantable timber would cumulate to the full value of the crop in about 16 years. Fourth, while steady increases in timber values would reduce the tax burden, only increases that significantly exceed the rise in the general price level would result in burdens falling much below those illustrated.

Finally, these calculations abstract from any speculative gains from timber holding. Fortuitous events such as a sharp increase in stumpage values at the time of harvest could yield returns on timber that are ignored here, but holding timber in anticipation of such events relates more to speculative investment than to the business of forest production.

Tree-farm land

The tax treatment of *tree-farm land* is designed to lighten the burden on forest landowners who undertake to manage their land according to approved forest practices. The land is evaluated for tax purposes by calculating the present (discounted) value, net of management costs and royalty, of the crops to be harvested in future periods according to the approved plan. This is in sharp contrast to the treatment of *timber land,* where harvestable timber is valued at the price it would bring if harvested immediately. The discounting of future values can reduce assessed values substantially. Two other contrasting features of the tax treatment of this land class should be recalled from the earlier description: the value the land may have in non-forestry uses is always ignored, and its assessed value is the full estimated value rather than half this amount as has hitherto been the case for other forest lands. Present and future harvest values are estimated from current appraised stumpage values on comparable Crown timber, and future yields are reduced to their present value using a discount rate of 14 per cent. The average rate of tax on these lands in 1974 was 4.87 per cent of their value calculated in this way.

Taxes are thus based on the present value of future harvests, and the weight of taxes can best be seen in relation to the value of those harvests. The time pattern of planned harvests is critical. Since the Taxation Tree Farms containing these lands differ in their present stand composition and hence also in their planned harvesting regime, it is not very useful to portray the tax burden on an average or representative unit. Accordingly, two polar cases are considered here: the first is a management unit containing a "normal forest", characterized by an even graduation of age classes and yielding a constant annual harvest; the second is one containing a single age class of trees to be harvested entirely in a future year.

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[56] *Timber land* must, by statute, be deemed to be held "for the purposes of forestry" but, unlike *tree-farm land,* this need not be the land's "best economic use". Taxation Act, *op. cit.,* s. 2. If other uses yield higher values, the land can be expected to be put to other use eventually, regardless of its tax treatment while it remains in forestry.

i) *The "normal forest" case.* About half of the current Taxation Tree Farms are taxed as if they contain a "normal forest", that is, they are taxed on the basis of a projected constant annual harvest. Thus, analysis of the burden in a "normal forest" situation is of considerable relevance, even though no units contain precisely this implied distribution of age classes.

The case of a "normal forest" is easiest to analyse, because the tax burden can be examined with reference to the taxes and the revenues in a single year (a comparison of the present values of all future revenues would yield the same result).[57] The 1974 tax rate of 4.87 per cent and the 14 per cent discount rate for determining assessed values produce a tax burden of approximately 35 per cent[58]—i.e. each year's taxes absorb approximately 35 per cent of the net value of each year's harvest.

Several important qualifications and observations on this result should be made. Tax rates vary over the province, depending upon the total of rates set by different School Districts, Regional Districts, Hospital Districts, and Improvement Districts. Where the rate differs from the 1974 province-wide average of 4.87 per cent, the resulting burden on *tree-farm land* with a balanced age distribution varies in direct proportion from the 35 per cent indicated above.

The discount rate used in assessing *tree-farm land* must allow not only for a return on the capital involved in a timber-growing enterprise, but also for property taxes payable on this capital. With an average tax rate of 4.87 per cent, the 14 per cent discount rate implies a return on capital of roughly 9 per cent.[59]

To the extent that annual harvests on balanced-age tree-farming enterprises are permitted to fluctuate, so that more is harvested when stumpage values are high and less when they are low, the effective tax burden would be reduced. This is because the landowner's average revenue over time would exceed the average stumpage value used in assessments. In practice this effect may not be large, however, because such responses to market conditions are constrained not only by officially approved working plans but also by the foresight of landowners.

The 35 per cent tax burden on *tree-farm land* is considerably less than the burdens noted above for *timber land,* but simple comparison of these figures is misleading. The difference arises not just because of different tax rates and assessment procedures, but also because different viewpoints are taken in the two calculations. For *timber land,* a single crop is considered in isolation; for *tree-farm land,* crops of varying ages are combined. Each of these procedures is valid for a different purpose: the former for evaluating the tax burden on a single crop over its life; the latter for evaluating the burden on a continuous tree-farming operation where stands of differing age classes are to be considered as a single management unit.

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[57] The tax burden on *timber land* was analysed by accumulating taxes at interest to the point of harvest. Precisely the same result would have been obtained by comparing the present values of taxes and stumpage returns. For a Taxation Tree Farm with a perpetual stream of harvests there is no natural point in the future at which to compare accumulated taxes and stumpage returns, so present values are used instead.

[58] With a tax rate of t and a discount rate for assessments of d, the tax burden becomes t/d.

[59] More precisely, if the return on capital is r, and the tax rate t, the discount rate is: $d = (1 + r) \times (1 + t) - 1$. With d at 14% and t at 4.87%, the implied return on capital is 8.71% after property taxes, but before taxes on personal or corporate income.

Combining age classes within a single management unit in this way ignores the time lag between the payment of property taxes on a particular crop and the realization of its stumpage revenue. The measure of burden used above for *tree-farm land* is equivalent to the simple sum (at zero interest) of the taxes payable on a single age cohort over its life, expressed as a percentage of that crop's stumpage value upon harvest, where the taxes are based each year on the crop's discounted harvest value. The difference between the burdens on *timber land* and *tree-farm land* does not arise entirely from combining crops of different ages, however. The same normal forest taxed under the *wild land* and *timber land* classifications would bear a significantly greater tax burden, indicating that the *tree-farm land* assessment procedure yields lower taxes.[60]

ii) *The single stand case.* The extreme opposite to a balanced age distribution with a steady annual harvest is a management unit which will be harvested entirely in one year and produce successive harvests at regular intervals thereafter. This case is also hypothetical, and such a harvesting regime would probably not be approved; but since any management unit (including one with perfectly distributed age classes) can be regarded as a composite of such even-aged stands, analysis of this case is nevertheless useful.[61]

The tax burden on land containing such an even-aged forest can be measured as the present value of all taxes to be paid on the existing and future crops, expressed as a percentage of the present value of all expected harvests. This gives a measure equivalent to those used above and, as in the case of *timber land,* the interest rate that would be used in discounting is the rate of return that a private owner would require on a long-term investment of this kind.[62] This need not, of course, be the 14 per cent used in the assessment procedure, nor its implied return on capital of (roughly) 9 per cent.

Table C-3 shows the tax burden, calculated in this way, for single-aged cohorts to be harvested initially in a varying number of years from the present, and using a variety of investor's rates of return in the discounting of taxes and stumpage values. For each such cohort it is the time which elapses before the initial harvest, not the precise age or mixture of ages within it, which causes the tax burden to vary. In all calculations the tax rate is assumed to be 4.87 per cent and the discount rate used in the assessment procedure is 14 per cent. The rotation age for subsequent harvests is assumed to be 100 years, but this arbitrary choice has only a small effect at the lowest discount rates and no effect at the higher rates.

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[60] This statement is based on a small number of quite crude examples such as those given in A. Milton Moore, *op. cit.*, pp. 180–182. Estimating the burden for *timber land* in this manner is difficult since it is necessary to follow the land and timber crop through the progression from *wild land* to *timber land* as the crop matures. The results depend critically on such matters as the bare land assessments on *wild* and *timber land* (which may reflect its value in other uses); the assessed value of immature timber; the quality of the site and the length of time the crop takes to reach maturity; the volume per acre at harvest; and other parameters. In contrast, basing the property tax on the present value of stumpage, as is done for *tree-farm land,* yields a result that depends only on the tax and discount rates, and is quite independent of all these other implications.

[61] When each stand is analysed separately, its value is derived entirely from its own ultimate stumpage value. Under sustained yield regulatory procedures, immature stands take on added value to the landowner by justifying a larger current cut from mature stands. This "allowable cut effect" does not emerge in this analysis.

[62] No such discount rate was required to calculate the tax burden in the on going "normal forest" case because the result is independent of any rate that might be chosen.

Table C-3

TAX BURDENS ON HYPOTHETICAL TREE FARMS BEARING A SINGLE-AGED CROP[1]

years to initial harvest	owner's required rate of return						
	4%	6%	8%	8.71%[2]	10%	12%	14%
	tax burden in per cent						
1	8	8	8	8	8	8	9
2	12	12	12	12	12	13	13
3	16	16	16	16	16	17	17
5	21	22	23	23	23	25	26
10	31	34	36	37	40	43	47
15	38	42	47	49	53	60	68
20	42	48	55	58	64	76	90
40	48	58	72	79	94	126	175
60	49	60	78	87	108	161	261
80	49	61	80	90	115	185	346
100	49	61	81	91	118	203	431
Limit[3]	49	61	81	92	122	244	no limit

[1] Tax burden is measured as the present value of taxes expressed as a percentage of the present value of net stumpage revenues, with the return on capital used to calculate the present value in each case. A tax rate of 4.87% is used in all cases; other rates would alter the calculated burdens proportionately.

[2] This is the rate of return on capital implicit in the 14% discount rate used for assessments with a 4.87% tax rate.

[3] This is the theoretical limit which the burden approaches asymptotically as the period to harvest is extended.

The tax burden is shown to be conspicuously higher on crops that will be held for longer periods before initial harvesting, because the longer the first revenues are postponed the more taxes the crop will bear and the more the value of the crop is discounted. It is also apparent that the higher the rate of return an owner expects on his forest investment the higher will be his perceived tax burden.[63] Tax rates other than 4.87 per cent would yield proportionate changes in the indicated burdens, as long as the discount rate used in the tax assessment remains unchanged.

The tax burden on a "normal forest" can be calculated from Table C-3 as the weighted average of the burdens for the various age classes, where the weights are the present values of the future stumpage returns from each class. The 35 per cent burden given earlier arises (in spite of a predominance of larger figures in the table) because of the heavier weights that discounting gives to the classes nearer harvest.[64] The tax burden for a management unit with any other age distribution can be determined as a similar weighted average. Units with harvests earlier, on balance, than the "normal forest" bear a lighter burden; those with later harvests bear a heavier burden.

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[63] The effect of expected increases in stumpage values can be approximated by referring to the burden under the column headed by an interest rate which is equal to the owner's required rate of return less the anticipated annual rate of increase in stumpage prices. Thus if the owner's rate of return is 10% and stumpage values are expected to rise by 2% annually, the burden is roughly that indicated under the 8% column.

[64] The "normal forest" calculation is unaffected by the investor's discount rate, because the rising burden associated with higher discount rates is offset by the decline in the younger cohorts' weights in the average.

The results in Table C-3 correspond more closely to the indicated tax burdens on *timber land*. Each looks at a stand in isolation, and comparing the present value of tax payments to the present value of stumpage returns (as is done here) is equivalent to comparing the cumulative value of those same payments to the point of harvest with the stumpage value at that time (as was done for the *timber land* calculations).[65] Yet except for crops only a few years from harvest, when prospective burdens are light for both classes of land, the burdens indicated in Table C-3 are much lower than those for *timber land*—a result that is the more surprising in view of the fact that the tax rate is a much higher percentage of the estimated value of *tree-farm land* than of *timber land*.

The explanation lies in the different methods of evaluating timber. On *timber land*, merchantable timber is valued, each year, at the revenue it would bring if harvested immediately; on *tree-farm land* it is valued as the present worth of the stumpage value to be realized according to the planned harvest schedule. The estimated value of mature crops on *tree-farm land* is therefore lower unless, during the last decade or so prior to harvest, merchantable timber adds value through volume or stumpage price increases at an annual rate greater than the 14 per cent discount rate used in tax valuation—a phenomenon that must be considered unlikely in view of the long rotation periods typically adopted in British Columbia. For immature crops the *tree-farm land* valuation using a 14 per cent discount rate is also much less than even the bare land assessments of *timber* or *wild land*. Except for timber within a few years of harvest, discounting future revenues at a 14 per cent rate yields assessed values that are sufficiently lower, to more than offset the effect of applying a tax rate to *tree-farm land* which is a larger percentage of estimated value.

Although no Taxation Tree Farms contain a single age class, the relevance of these examples derives from the fact that any management unit can be viewed as a combination of such cohorts, and its tax burden is an average of those on its component parts. Thus, the tax burdens for these hypothetical even-aged units give some indication of the burdens on actual management units whose planned harvests deviate from that of the "normal forest". It must be emphasized, however, that within any management unit the burdens on the separate pieces have little relevance, since working plans and property taxes pertain to the unit as a whole. Moreover, the results presented here for particular age classes cannot be used to illustrate the tax burdens on those age classes when viewed as incremental parts of a management unit, since the planned harvests from other parts of the unit would probably be altered if such incremental changes were made.

CUMULATED BURDENS AND THE RETURN ON FOREST INVESTMENTS

In concluding this discussion of tax burdens, it should be emphasized that the dollar amounts of burden estimated, and the share of net values of forest production that the charges are shown to absorb, cannot be interpreted as measures of the extent to which these charges encroach on the value of private owners' investments. In normal market circumstances, the value of a parcel of forest land to a prospective purchaser or seller is the present worth of expected production from the land net of all expected costs (including taxes), where all future revenues and costs are discounted at the rates of return required by investors. Taxed land is worth less than untaxed land, and expected taxes thus reduce the price and asset value of forest lands. Unless a purchaser's expectations about taxes are not borne out, the taxes will not interfere with the returns he expects and realizes on his forest assets.

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[65] The calculated burden for *timber land* takes account only of the taxes payable up to the first harvest, while the burden calculated here for *tree-farm land* reflects also the taxes payable beyond the initial harvest. This has an insignificant effect on the results, however.

Thus, while we have referred to the "burden" of taxes and charges on timber and forest land, it is only unexpected increases in such levies that can be regarded as a "burden" borne by the present private owner. Correspondingly, levies which fall short of expected levels will result in a gain to present owners. In short, while a heavy tax burden (such as some of those calculated above) implies that taxes absorb a large fraction of the total value of the timber produced, it indicates little about the profitability of forest properties.

APPENDIX D

REGULATING THE HARVEST RATE*

This Appendix examines the public policy governing the rate of timber harvesting in British Columbia. The importance of this aspect of forest policy can hardly be overemphasized, because it effectively limits the size and rate of growth of the forest industry. By determining the scope for the extractive sector of the industry, policy arrangements influence the size, type, and location of manufacturing activity as well. In consequence, harvest regulation has important repercussions for the pattern and pace of economic development, employment, and the level of public revenues that flow directly and indirectly from the forest resource. These far-reaching implications make regulation of harvest rates one of the more (if not the single most) critical aspects of forest policy from an economic point of view.

The Commission's terms of reference instruct the Commissioner to examine, among other things, "The extent to which the forest resources of the Province are committed to use . . .". Clearly, this degree of commitment can be quantified only in terms of the harvesting authorized through the tenure system as measured against the forest inventory and its capacity for growth.

The criteria used by the B.C. Forest Service to determine harvesting levels are not widely understood, and have hitherto not been well documented in an easily accessible form. This Appendix offers an explanatory review and critique of the present policy, to provide the background necessary for detailed consideration of the arguments in Chapter 17.

THE SUSTAINED YIELD PRECEPT

The objective of managing forests so that they will produce a more or less continuous yield of timber has been widely accepted among professional foresters for many centuries.[1] In its broadest sense, sustained yield implies that the land is to be kept occupied by growing stands of trees. Thus, a sustained yield forest may be one which is entirely cut over and regenerated at the end of each rotation.[2] However, foresters generally interpret sustained yield more restrictively than this, and regard a sustained yield forest as an area which is managed to produce, in perpetuity, crops of equal or nearly equal volumes of wood annually, or at least at intervals shorter than one rotation.[3]

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* The first, descriptive, part of this Appendix is extracted from *Regulation of the Rate of Timber Harvesting in British Columbia,* Policy Background Paper produced by this Commission, Victoria, 1975, 40 pp. + Appendices. Dr. David Haley assisted the Commission in preparing both the Background Paper and this Appendix, and several officers of the Forest Service provided helpful information and guidance, especially Messrs. G. W. Allison, A. L. Parlow, J. Flint, D. Selkirk, and D. R. Glew.

[1] For a detailed description of the evolution of the principles of forest management, see N. V. Brasnett, *Planned Management of Forests,* Allen and Unwin, London, 1953, 238 pp. A review of forest yield planning terminology, methods, and problems can be found in A. J. Grayson and D. R. Johnson, "The Economics of Yield Planning", *International Review of Forestry Research,* Volume 3, 1970, pp. 69–122.

Closely allied to this latter interpretation of sustained yield is the notion of the "normal" forest, which in its simplest interpretation is a forest organized in such a way that there is an even, or "normal", distribution by area of each age class. For example, a 1000-acre forest on a 100-year rotation would contain 10 acres in each age class from one to 100 years. Each year the 10 acres aged 100 years would be harvested and restocked, thus maintaining the "normal" age class distribution. Of course, a "normal" distribution of age classes over the forest area would result in an equal yield of timber each year only if the forest area was completely homogeneous with respect to fertility, stocking, and species composition. More generally, therefore, a "normal" forest is thought of as one so structured in stocking, age, and site class distribution, that it is capable of producing an equal annual or periodic volume of wood, in perpetuity.

Theoretically, a "normal" forest is capable of yielding a harvest, each year, equal to the annual growth of the forest's total growing stock. This growth, and hence the yield that can be sustained, depends on the area and age of the forest, the productivity of the land, and the chosen rotation. In such a forest, the shorter the rotation the less volume becomes available for harvesting on *each acre,* but *more acres* can be harvested each year. There is a certain age, or rotation, that will maximize the average annual rate of growth. While yield can be sustained at any level below this maximum, the concepts of "sustained yield" and "maximum sustained yield" are synonymous in much of the forestry literature.

The "normal" forest represents the theoretical ideal towards which many forest managers aspire. While it is generally recognized as Utopian, it is, nevertheless, considered to be a useful yardstick against which to compare the structure of existing forests, and it is a fundamental concept governing many forest management decisions in British Columbia.

Most forests have either less growing stock than that required to sustain the desired harvest level, or a surplus of growing stock. Examples of the former can be found in such countries as the United Kingdom and New Zealand, which have expanding forest estates based almost entirely on plantations of exotic species. British Columbia, on the other hand, is in the latter category. Here, most forest management units have a surplus of mature and over-mature forest stands relative to a "normal" forest.

Where there is a deficit of growing stock, the problem is one of building up the inventory to a level and structure commensurate with long-term yield objectives. Where there is a surplus, as in British Columbia, the problem is one of choosing, from an infinite number of alternatives, that rate of harvesting mature and over-mature timber which will best meet the long-term objectives of the forest owner. The solution to this problem is generally constrained, particularly at the public level, by a number of important biological, economic, social, and technical considerations.

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[2] The rotation is the period which elapses between establishment of a forest stand and its final harvest. The choice of rotation length is one of the major variables determining the profitability of a forest enterprise and the volume of timber that a forest area is capable of producing on a sustained basis. For these reasons, it is the subject of a great deal of controversy. (See, for example, M. M. Gaffney, *Concepts of Financial Maturity of Timber and Other Assets,* Information Series No. 62, Department of Agricultural Economics, N. Carolina State College, 1960, 105 pp.; and P. H. Pearse, "The Optimum Forest Rotation", *Forestry Chronicle* 43(2), 1967, pp. 178–193.)

[3] Sustained yield has been defined by international agencies as "The yield that a forest can produce continuously at a given intensity of management. Sustained yield management implies continuous production so as to achieve at the earliest practical time a balance between increment and cutting". F. C. Ford Robertson (editor), *Terminology of Forest Science, Technology, Practice and Products.* Society of American Foresters, Washington, D.C., 1971, 349 pp.

The next two sections of this Appendix examine the methods adopted by the B.C. Forest Service to determine the rate of timber harvesting on forest lands under its regulatory control.

EVOLUTION OF CUT CONTROL POLICY IN BRITISH COLUMBIA

Prior to 1947 there was no policy in British Columbia for regulating the rate of timber harvesting. During the 1930's, concern had arisen over the unregulated pattern of harvesting and the inadequate provisions for continuity of forest yields. In 1937, F. D. Mulholland published a detailed description of the forest resources of British Columbia[4] in which he recognized the need for yield control and advocated a policy of "continuous regional production of wood for stable permanent industries".[5]

In 1943, the second Royal Commission of Inquiry relating to the forest resources of British Columbia[6] was appointed, with terms of reference requiring it to investigate, among other things, "the establishment of forest yield on a continuous production basis".[7] The Commissioner recommended a programme of sustained yield forest management for British Columbia and proposed a variety of new tenure arrangements designed to accomplish this objective.

Sustained yield was defined in the Commission's report as

> . . . a perpetual yield of wood of commercially usable quality from regional areas in yearly or periodic quantities of equal or increasing volume,[8] . . .

and the concept of *maximum* sustained yield was strongly endorsed.

> That, then, must be our objective: To so manage our forests that all our forest land is sustaining a perpetual yield of timber to the fullest extent of its productive capacity.[9]

The Commissioner considered the main advantages of such a policy to be the stabilization of regional economies based upon forest industries, and provisions for non-timber products of the forest:

> . . . a sustained yield policy, perpetuating our forest stands, will not only provide a continuity of wood supply essential to maintain our forest industries, primary and secondary, with consequent regional stability of employment, but will also ensure a continued forest cover adequate to perform the invaluable functions of watershed protection, stream flow and run-off control, the prevention of soil erosion, and of providing recreational and scenic areas, and a home for our wild bird and animal life.[10]

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[4] F. D. Mulholland, *Forest Resources of British Columbia,* British Columbia Forest Service, Victoria, 1937, 153 pp.

[5] *Ibid.,* p. 47.

[6] Its report was the *Sloan Report 1945.*

[7] *Ibid.,* p. 7.

[8] *Ibid.,* p. 127.

[9] *Loc. cit.*

[10] *Ibid.,* p. 128.

The forms of sustained yield units subsequently created—Tree-farm Licences, Public Sustained Yield Units, Taxation Tree Farms, and Farm Wood-lot Licences—are described elsewhere in this report. Today most of the forest land of the province is included in 34 Tree-farm Licences and 81 Public Sustained Yield Units, with total productive areas of 10 million acres and 80 million acres respectively. In addition, there are 858 thousand acres of Crown-granted forest land, outside Tree-farm Licences, under sustained yield as Taxation Tree Farms under provisions of the Taxation Act.

Following establishment of the first sustained yield units in the late 1940's, the Forest Service was faced with the task of calculating allowable annual cuts. Most of the newly established units were undeveloped and consisted mainly of vast tracts of mature and decadent timber, well beyond an age that could be contemplated for continuous management. The problem, therefore, was to harvest the inventory of mature and over-mature timber in such a way as to ensure that by the time the last of it was removed, the first of an annual succession of new mature crops (i.e. crops of rotation age) would be available for harvesting.

After some investigation of alternative methods of yield control, the B.C. Forest Service adopted the Hanzlik formula.[11] This formula was designed to regulate forests containing a preponderance of mature timber, and in its simplest form can be expressed as follows:

$$\begin{array}{c}\text{allowable}\\ \text{annual cut}\end{array} = \frac{\begin{array}{c}\text{volume of}\\ \text{mature timber}\end{array}}{\begin{array}{c}\text{number of years}\\ \text{in rotation age}\end{array}} + \begin{array}{c}\text{mean annual increment}\\ \text{of immature stands over the}\\ \text{planned rotation age.}\end{array}$$

It is clear that if the management unit consisted entirely of mature timber, the first term on the right-hand side of the equation would yield a rate of harvesting which would produce a "normal" forest at the end of one rotation, provided adequate reforestation followed each harvest. The second term on the right-hand side of the equation allows for the growth in immature stands already present in the management unit.

At first, the formula could be applied in only a crude way because of inadequate inventory data. In the early 1950's, the best inventory available was that compiled between 1927 and 1936 and published by the Forest Service in 1937.[12] While some supplemental information had been collected during the 1940's, it was far from adequate to provide a basis for accurate yield planning. While reasonable estimates of mature timber volumes of certain species were available for many areas, information on the area, species composition, and growth rates of immature forest stands was mostly lacking. Very rough estimates of mean annual increments of immature stands were used in the Hanzlik formula to estimate a single average rotation age for each management unit, based upon the number of years required to produce stands of trees of sawlog size.

Since those early years of the sustained yield management programme the quality and quantity of forest inventory information available to the B.C. Forest Service have improved enormously and, as a result, the methods used to calculate allowable cuts have become far more sophisticated. In 1958, the first *Continuous Forest Inventory of British Columbia* was published[13] and subsequent revisions have been published periodically, the latest in 1975.[14]

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[11] E. J. Hanzlik, "Determination of the Annual Cut on a Sustained Yield for Virgin American Forests", *Journal of Forestry* 20 (6), 1922.

[12] F. D. Mulholland, *op. cit.*

An important part of the B.C. Forest Service Inventory Division's programme has been to produce localized estimates of growth and yield. To accomplish this they have used a graphical technique, and in 1963 introduced a series of *growth curves* which show the relation between stand volume and age. With information from field measurements, average volumes per acre (to "close utilization" standard, with deductions for decay) are plotted against age for each species type, geographical location, and site class. Currently, 17 type groups, 7 inventory zones and 4 site classes are used. There are now about 1500 growth curves for the province based on 48,000 samples; and these are being continuously revised as new information becomes available from the continuing inventory programme.

Since 1966, growth curves have served as the basic data for estimating the rate of forest growth and for determining the rotation period. They thus underlie calculations of the allowable annual cut, as explained in the following section; and the precision of allowable cut estimates, therefore, rests largely upon the accuracy of the data used to produce the growth curves and the assumptions underlying their construction.

DETERMINATION OF THE ALLOWABLE ANNUAL CUT

The B.C. Forest Service calculates and controls the allowable annual cutting rates in Public Sustained Yield Units, approves licensees' calculations and controls them in the case of Tree-farm Licences, and approves the harvesting schedules for Taxation Tree Farms. The allowable annual cut of a Public Sustained Yield Unit is defined by the B.C. Forest Service as:

> . . . that cut which has been approved by the Chief Forester, and the Forest Service will administer each public sustained yield unit on the basis of the approved allowable annual cut. Any other estimated cut of a public sustained yield unit shall not be referred to as the allowable annual cut.[15]

Several arms of the B.C. Forest Service are involved in the process of determining the allowable annual cuts for Public Sustained Yield Units. The Inventory Division supplies the most up-to-date inventory information, including growth curves for the unit in question, to the new Resource Planning Division. It is the responsibility of the Resource Planning Division to calculate an allowable annual cut—which in this Appendix will henceforth be called the *indicated allowable annual cut*—using the procedures described below. The indicated allowable cut is referred to the Administration Division and the relevant Forest District office where it is reviewed in light of special local conditions and administrative constraints. The Resource Planning Division then recalculates the allowable cut, if necessary, incorporating any changes recommended by the Administration Division and the District, and recommends this revised cut to the Chief Forester for his approval. This sequence of processes is indicated in Figure D-1.

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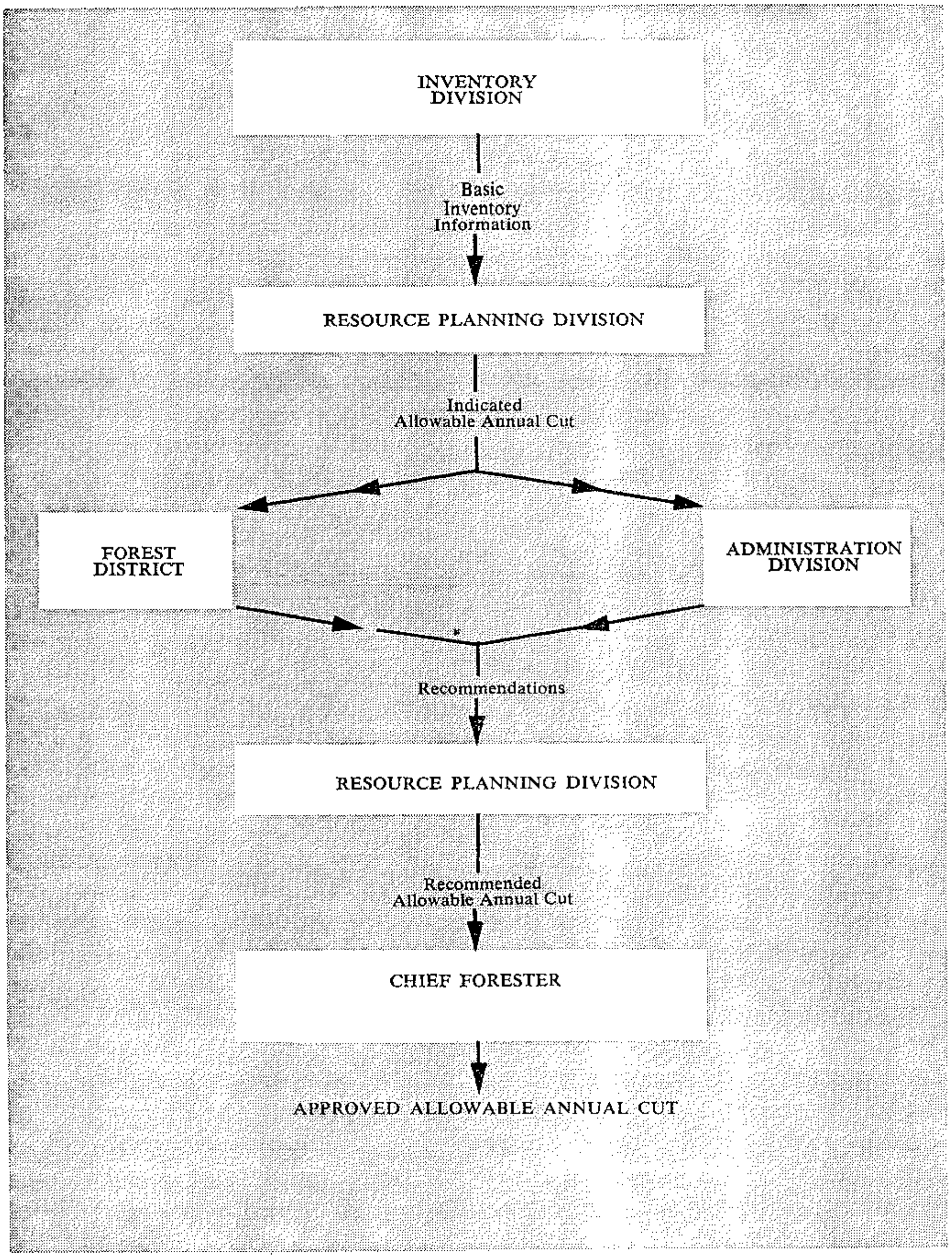
[13] B.C. Forest Service, *Continuous Forest Inventory of British Columbia, Initial Phase, 1957,* Inventory Division, Victoria, 1958, 221 pp.

[14] B.C. Forest Service, *Forest Inventory Statistics of British Columbia, 1973,* Inventory Division, Victoria, 1975, 213 pp.

[15] B.C. Forest Service, *Forest Management Manual,* Section 19.21 A.L. 49.

Figure D-1

ADMINISTRATIVE ORGANIZATION FOR CALCULATING AND APPROVING ALLOWABLE CUTS IN PUBLIC SUSTAINED YIELD UNITS


INVENTORY DIVISION
Basic Inventory Information
RESOURCE PLANNING DIVISION
Indicated Allowable Annual Cut
FOREST DISTRICT
ADMINISTRATION DIVISION
Recommendations
RESOURCE PLANNING DIVISION
Recommended Allowable Annual Cut
CHIEF FORESTER
APPROVED ALLOWABLE ANNUAL CUT

Source: Regulation of the Rate of Timber Harvesting in British Columbia, p. 15.

Allowable annual cuts for Tree-farm Licences are calculated by the licensees and referred for approval to the Inventory Division of the Forest Service. Approved allowable cuts are administered and controlled by the Administration Division.

Holders of Taxation Tree Farms are required to submit, for approval by the Minister of Forests, a management plan designed to ensure that the lands will be maintained in continuous productivity.[16] On submission of an application, the management plan is examined by the Administration Division of the B.C. Forest Service in co-operation with the Co-ordinator of Timber Appraisal of the B.C. Assessment Authority to determine whether it meets the requirements of the Taxation Act. If it is satisfactory, the plan is recommended to the Chief Forester for his approval on behalf of the Minister. Routine administration of Taxation Tree Farms is delegated to the Co-ordinator of Timber Appraisal, who obtains advice from the B.C. Forest Service when required.

CALCULATION OF THE INDICATED ALLOWABLE ANNUAL CUT

The allowable annual cut calculation as carried out by the Resource Planning Division, though evolved from the Hanzlik formula, now differs considerably from the simple Hanzlik approach described earlier. The calculation procedures are rather complex and, for purposes of exposition, can be divided into four major stages, as follows:

1. processing basic inventory information;
2. calculation of the indicated average rotation;
3. the Area Volume Allotment Check;
4. calculation of the net allowable annual cut.

Each of these steps will be described seriatim. The sequence of calculations described below is summarized in Figure D-2.[17]

Stage 1. Processing basic inventory information.

Information supplied by the Inventory Division for the purposes of allowable cut calculation includes:

i) A summary of the area in the unit concerned by mature forest types;[18] immature forest types; forest land not currently supporting a commercial crop of timber;[19] and alienated forest land.[20]

ii) The growth curves to be used for *each* forest type in the unit.

iii) A summary, from the growth curves, of mature stands in the unit by site class, forest type, area, and volume, to the nearest thousand cubic feet,

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[16] Taxation Act, s. 38.

[17] An actual calculation of the allowable annual cut for one of the province's Public Sustained Yield Units is presented in *Regulation of the Rate of Timber Harvesting in British Columbia, op. cit.*

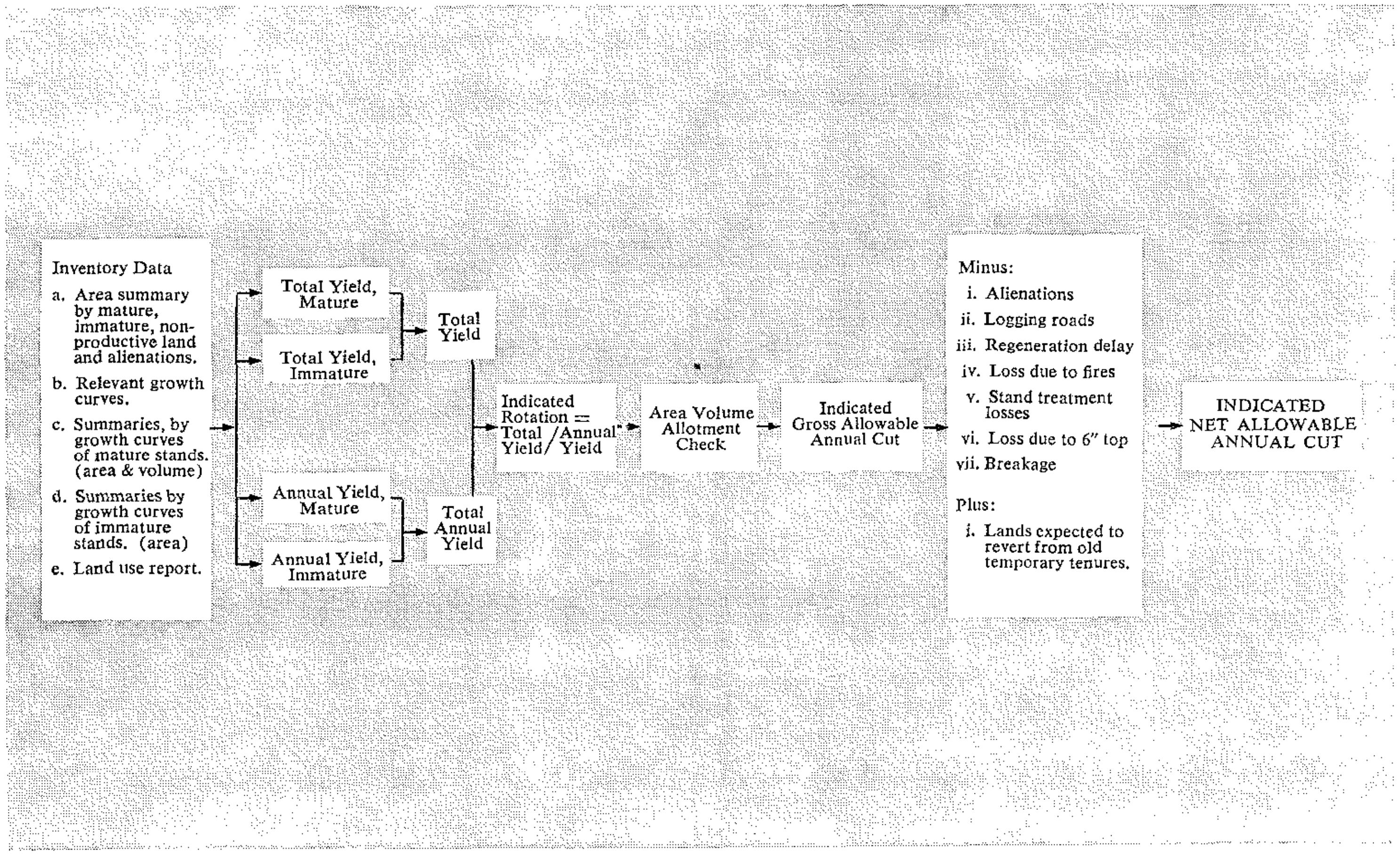
[18] For inventory purposes, stands throughout the province of all coniferous species, except lodgepole and whitebark pine, are regarded as mature if they are 121 years old or more. Lodgepole and whitebark pine stands and stands of broad-leaved species are considered mature if they are 81 years old or over. However, for purposes of the allowable cut calculation, stands of *all* species are regarded as mature if they are 121 years old or more.

[19] Forest land not currently supporting a commercial crop of timber is classified as residual forest, not satisfactorily restocked, non-commercial cover, and disturbed—stocking doubtful (these classifications are described in Chapter 20).

[20] "Alienation" in this context refers to any productive forest land on which the Forest Service is not free to allocate harvesting rights.

Figure D-2

SCHEMA OF ALLOWABLE CUT CALCULATION PROCEDURE


Inventory Data
a. Area summary by mature, immature, non-productive land and alienations.
b. Relevant growth curves.
c. Summaries, by growth curves of mature stands. (area & volume)
d. Summaries by growth curves of immature stands. (area)
e. Land use report.
Total Yield, Mature
Total Yield, Immature
Annual Yield, Mature
Annual Yield, Immature
Total Yield
Total Annual Yield
Indicated Rotation = Total Yield / Annual Yield
Area Volume Allotment Check
Indicated Gross Allowable Annual Cut
Minus:
i. Alienations
ii. Logging roads
iii. Regeneration delay
iv. Loss due to fires
v. Stand treatment losses
vi. Loss due to 6" top
vii. Breakage
Plus:
i. Lands expected to revert from old temporary tenures.
INDICATED NET ALLOWABLE ANNUAL CUT

for all types, all sites, and all access.[21] Volumes are expressed to "close utilization" standards,[22] less decay, for all trees more than 7.1 inches d.b.h. in the Interior and more than 9.1 inches d.b.h. on the Coast.

iv) A summary, from the growth curves, of immature stands in the unit by site class, forest type, and distribution of area by age class for all sites, all types, and all access.

v) A description of present and potential land use within the boundaries of the unit.[23]

With this basic information, the next step is to calculate the *total yield* of the unit. The yield of mature stands is the sum of total volumes for all site classes and forest types. The total yield of immature stands is calculated from the appropriate growth curves. For each forest type reference is made to the relevant growth curve to determine the age at which the mean annual increment culminates and the total volume per acre indicated at that stage. This volume is multiplied by the number of acres in the type to give the total yield for that type. A similar calculation is performed for each forest type and site class and the total gross yield for all immature stands is then summed.

The final step, at this stage, is to calculate the *total annual production* of merchantable timber on the unit. For both mature and immature stands, this figure is derived from growth curves. In the case of mature stands, the actual volume is divided by the number of years in the rotation period corresponding to the culmination of mean annual increment for that timber type and site class. The annual yield of immature stands is calculated directly from the growth curves by multiplying the maximum mean annual increment for each timber type and site class by the number of acres in the class. This is essentially an application of the Hanzlik formula described earlier, and it provides a "tentative" allowable annual cut.

Stage 2. Calculation of Indicated Average Rotation.

The indicated average rotation is determined by dividing the total yield by the annual yield. In other words, it is an estimate of the number of years the timber on the unit will last if, each year, a volume equal to the total annual production, calculated as described above, is harvested.

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[21] "All sites" means that Good, Medium, Poor, and Low site classes are included. Site class refers to the growth capacity of the forest land, and is defined in terms of a site index (the average height of a stand at 100 years) which varies among species. For example, site classes for Interior Douglas fir are defined as follows:

Good	Medium	Poor	Low
Site Index			
91+	71 — 90	41 — 70	0 — 40

Only areas with non-productive tree cover, including alpine forest, are excluded from allowable cut calculations. It should be noted, however, that since 1974, while all sites are considered when calculating the indicated rotation, low sites and all sites producing less than 11 cubic feet of merchantable timber per acre per annum are *excluded* from the Area Volume Allotment Check, thereby eliminating them from the allowable cut.

"All types" means that all forest types, including deciduous, are included in the allowable cut calculation.

"All access" means that *all* merchantable timber in the unit, regardless of whether it is accessible by today's standards or not, is included in the allowable cut.

[22] "Close utilization" includes the usuable portion of the stem between a one-foot stump and 4-inch top diameter inside bark. See Glossary.

[23] The Forest Service is in the process of introducing a new programme of delineating Environmental Protection Areas. These areas, which will be designated in close co-operation with Forest District staff and other resource agencies, will provide important additional information for incorporation into the allowable annual cut calculation.

Stage 3. Area Volume Allotment Check.

The objective of the Area Volume Allotment Check is to ensure that the tentative annual cut will actually last for the total number of years in the indicated rotation and that during the rotation period there will be no shortages of any age classes which would lead to curtailment of cutting. This adjustment to the annual yield is necessary since the calculation above implies that immature stands will yield a volume at harvest equal to the volume indicated by the growth curves at the age of culmination of mean annual increment. This will rarely be the case, however. During the first rotation most presently immature stands will be harvested at an age well beyond their planned rotation age and will therefore yield a merchantable volume greater than that assumed in the preliminary calculation of the annual yield. If, of course, there is a deficit of mature timber in the unit it will be necessary to harvest immature stands before they reach the age of culmination of mean annual increment. However, under no circumstances will the Forest Service schedule stands for harvesting which have not reached 85 per cent, or more, of their planned rotation age.

The tentative allowable annual cut is adjusted upwards or downwards, by trial and error, until the period taken to cut all age classes in the unit once is within 1 per cent of the indicated rotation. The final Area Volume Allotment Check results in a table showing the area and gross yield for each age class represented in the unit, the average age (to the nearest 10 years) at which each immature age class will be cut, the number of years required to cut each age class, and the cumulative number of years taken to cut over the whole unit.

One such table, for the Quesnel Lake Public Sustained Yield Unit, is shown in Table D-1. The indicated rotation period for this unit, calculated by the procedure described earlier, is 92.0 years. The trial and error test of the Area Volume Allotment Check resulted in an upward adjustment of the proposed allowable cut from 61,251 thousand cubic feet to 68,534 thousand. The table shows that the mature stands in the unit (age classes 7 to 9) will be cut over in 51.8 years (3,546,302÷68,534). The average cutting age

Table D-1

SUMMARY OF AREA VOLUME ALLOTMENT CHECK FOR THE QUESNEL LAKE PUBLIC SUSTAINED YIELD UNIT

Proposed Allowable Annual Cut=68,534 Mcf.[1]

age class	average age of harvesting	area	gross yield	number of years to cut class	cumulative years of cut
	years	acres	Mcf.[1]		
7–9		743,366	3,546,302	51.8	51.8
6	160	27,894	124,961	1.8	53.6
5	140	216,049	1,014,477	14.8	68.4
4	140	166,719	699,435	10.2	78.6
3	130	175,331	619,625	9.0	87.6
2	120	58,538	175,385	2.6	90.2
1	100	52,495	128,412	1.9	92.0

[1] Mcf. means thousand cubic feet.

Source: Regulation of the Rate of Timber Harvesting in British Columbia, p. A-6.

of class 6 will therefore be 160 years (110+52 to the nearest ten years). This age class will last for 1.8 years (124,961÷68,534). Similarly, the average cutting age of age class 5 will be 140 years (90+52+2). This procedure is continued for each age class in turn until the whole unit has been allocated. At this point, as can be seen from the final column in Table D-1, it will have taken 92.0 years to cut over the unit, which is the same period as the indicated rotation.

Stage 4. Calculation of the Net Allowable Annual Cut.

The allowable annual cut resulting from the Area Volume Allotment Check is next adjusted to take account of certain factors that are expected to impinge on the harvests estimated by the above procedures.

i) *Alienations.* In any management unit it is expected that some forest lands will be alienated or withdrawn from timber production during the rotation period for such purposes as Crown grants, parks, rights-of-way, and so on. The area of such withdrawals is estimated subjectively, in the light of past experience and available information on local conditions obtained from the Forest District office and other Crown agencies. The estimated areas are deleted from the productive acreage in the management unit and the allowable cut correspondingly reduced. Similarly, where it can be foreseen that areas will be added to the productive area, these are also estimated subjectively. Notable in this respect are the areas under old temporary tenures which are to be incorporated into the unit when they revert to the Crown upon removal of the mature timber. It should be noted that while such areas are added to the productive area of the Public Sustained Yield Units, no attempt is made to include the future productive capacity of these lands in the Area Volume Allotment Check.

ii) *Logging roads.* Main haul roads are normally expected to be kept open during the rotation to facilitate forest management and protection, and as access for other resource users. The estimated area occupied by such roads similarly results in a proportionate reduction in the allowable cut. (Spur roads are assumed to revert back to productive forest and to regenerate at the same rate as logged over areas.)

iii) *Regeneration delay.* After an area is logged, there is often a lapse of a few years before a new tree crop is established, either naturally or artificially, and this unproductive period calls for an adjustment in the calculated allowable cut. Throughout the Coast, an average regeneration delay of five years is assumed. In the Interior, the assumed average delay is five years in the wet zone and ten years in the dry zone.[24] The estimated average regeneration delay is multiplied by the average number of acres to be logged each year throughout the rotation, including the area of permanent roads. This area is deducted from the productive acreage.

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[24] If an area fails to regenerate satisfactorily during this period or regenerates faster than average, this is ascertained at the next unit survey and the necessary adjustments made in the recalculated allowable cut. Fairly detailed information on the history of each area logged is maintained at the District level; however, it is too cumbersome at the present time to incorporate this information into allowable cut calculations and broad average regeneration delays are considered adequate.

iv) *Fire losses.* The anticipated incidence of fire is based on its historical occurrence in the unit, and the same regeneration delay as for logged areas is applied.

v) *Stand treatment losses.* These are losses resulting from logging activity and silvicultural cutting prescriptions. They include unrecovered blowdown along the edges of logging settings, seed-blocks and seed-trees not recovered, and unrecovered blowdown in "fifty per cent leave" areas. An average loss factor of five per cent is used throughout the province.

vi) *Loss in 6-inch tops.* The inventory information, summarized in the growth curves, is based on the assumption that the wood in each merchantable tree will be recovered to a 4-inch top diameter inside bark. In some cases, where the average utilization in a Public Sustained Yield Unit is for only 6-inch top recovery, a reduction in the allowable cut is necessary. These losses are carefully calculated by species and expressed as zonal averages.

vii) *Breakage.* A certain loss in volume is allowed for non-recoverable breakage during harvesting operations.

The gross allowable annual cut is thus reduced by these "non-recoverable losses" to yield the *indicated allowable annual cut.* These adjustments have the effect of reducing the cut by an average of about 25 per cent in the Public Sustained Yield Units, varying among units from 14 to 35 per cent.

The indicated allowable cut is referred by the Resource Planning Division to the Administration Division and the relevant Forest District office where it is reviewed in the light of local conditions and administrative constraints. For example, local knowledge about the condition of certain forest types might warrant their withdrawal from the allowable cut, or there may be particular pressures in the unit for alienation of productive forest land which calls for readjustments in the calculation of non-recoverable losses. The Resource Planning Division recalculates the allowable cut if necessary, and recommends it to the Chief Forester for his approval. The calculated gross and *approved allowable cut* for each Public Sustained Yield Unit is shown in Table D-2. The approved allowable cut provides the constraint for harvesting authorizations.

Table D-2

ALLOWABLE CUTS, COMMITTED CUTTING RIGHTS, AND HARVESTS IN PUBLIC SUSTAINED YIELD UNITS

Public Sustained Yield Unit	allowable annual cut gross calculated	allowable annual cut approved[1]	commitments under licences[2]	current harvest[3]	*fraction of approved allowable cut committed*	*fraction of approved allowable cut harvested*
	thousands of cunits				*per cent*	
Vancouver Forest District						
Dewdney	746.1	559.6	458.2	393.8	*82*	*70*
Kingcome	804.0	603.0	410.1	304.7	*68*	*51*
Nootka	550.7	413.0	396.2	247.8	*96*	*60*
Quadra	1,034.7	776.0	693.7	522.9	*89*	*67*
Soo	361.3	271.0	217.8	207.5	*80*	*77*
Vancouver	273.1	179.2	110.4	89.2	*62*	*50*
total	3,769.9	2,801.8	2,286.4	1,765.9	*82*	*63*

Table D-2—*Continued*

Public Sustained Yield Unit	allowable annual cut		commitments under licences[2]	current harvest[3]	*fraction of approved allowable cut committed*	*fraction of approved allowable cut harvested*
	gross calculated	approved[1]				
	thousands of cunits				*per cent*	
Prince Rupert Forest District						
Dean, Block 1	566.7	459.0	146.0	105.3	*32*	*20*
Dean, Block 2	74.7	60.5	26.8		*44*	
Hecate	1,153.3	831.9	202.1	114.6	*24*	*14*
Queen Charlotte	666.2	499.7	127.3	116.3	*25*	*23*
Rivers Inlet	684.0	575.1	101.8	88.2	*18*	*15*
Babine	547.7	464.4	200.0	115.2	*43*	*25*
Bell-Irving	192.3	125.0	n/a	.4[4]	*n/a*	*0*
Burns Lake	370.0	264.0	217.4	120.3	*82*	*46*
Morice	343.1	280.7	93.4	63.0	*33*	*22*
Ootsa	792.3	632.8	434.1	192.7	*69*	*30*
Skeena	1,253.9	1,006.6	391.3	407.8	*39*	*41*
Smithers	415.4	315.1	170.5	109.4	*54*	*35*
total	7,059.5	5,514.8	2,110.7	1,433.2	*38*	*26*
Prince George Forest District						
Big Valley Bl. 1	110.4	83.3	78.0	79.0	*94*	*95*
Blueberry	470.0	305.5	82.1	114.8	*27*	*38*
Canoe	113.4	87.3	64.1	68.0	*73*	*78*
Carp	510.0	341.7	268.9	257.4	*79*	*75*
Crooked River	270.0	180.9	169.2	159.3	*94*	*88*
Finlay	1,864.6	1,212.0	1,000.0	500.7	*83*	*41*
Fort Nelson	545.0	408.8	n/a	68.9	*n/a*	*17*
Kluskus		107.0[5]	90.0	0.0	*84*	*0*
Longworth	384.1	295.0	176.6	141.1	*60*	*48*
Moberly	454.7	346.2[6]	90.6	56.0	*26*	*16*
Monkman	266.7	205.3	146.3	113.8	*71*	*55*
Naver Block 1	57.4	41.5	39.1	105.1	*94*	*90*
Naver Block 2	104.4	75.5	71.0		*94*	
Nechako	830.8	556.6	501.6	484.7	*90*	*87*
Parsnip	330.8	221.6	204.2	186.8	*92*	*84*
Peace	348.3	269.1	122.3	67.2	*45*	*25*
Purden	226.7	174.5	158.3	133.4	*91*	*76*
Robson	162.7	125.2	67.3	69.6	*54*	*56*
Stuart Lake	510.7	385.0	170.3	164.6	*44*	*43*
Takla	798.7	642.3	339.9	120.5	*53*	*19*
Wapiti	501.7	390.9	90.5	51.0	*23*	*13*
Westlake	246.2	164.9	154.0	134.3	*93*	*81*
Willow River	153.6	119.1	112.2	114.4	*94*	*96*
total	9,260.9	6,739.2	4,196.5	3,190.6	*62*	*47*
Cariboo Forest District						
Big Bar	250.0	177.8	135.3	51.5	*76*	*29*
Big Valley Bl. 2	92.0	69.4	65.1	65.3	*94*	*94*
Bowron	68.0	52.0	49.0	49.1	*94*	*94*
Chilko	361.9	253.3	30.0	10.0	*12*	*4*
Cottonwood	271.2	208.3	200.6	187.6	*96*	*90*
Lac La Hache	505.2	337.0	292.1	295.5	*87*	*88*
Narcosli	488.6	355.1	348.5	318.8	*98*	*90*
Quesnel Lake	685.3	523.6	340.9	318.4	*65*	*61*
Stum	401.5	317.2	271.4	232.8	*86*	*73*
Williams Lake	203.8	154.9	121.8	145.8	*79*	*94*
total	3,327.5	2,448.6	1,854.7	1,674.8	*76*	*68*

Table D-2—*Continued*

Public Sustained Yield Unit	allowable annual cut gross calculated	 approved[1]	commitments under licences[2]	current harvest[3]	*fraction of approved allowable cut committed*	*fraction of approved allowable cut harvested*
	tthousand of cunits				*per cent*	
Kamloops Forest District						
Adams	211.4	175.5	140.8	116.2	*80*	*66*
Ashnola		104.9[5]	90.8	62.9	*87*	*60*
Barriere	128.6	91.3	85.3	66.4	*93*	*73*
Barton Hill	50.6	43.2	39.5	43.3	*91*	*100*
Big Bar	—[7]	—[7]	—[7]	37.1	—[7]	*21*
Botanie	194.8	144.4	109.4	76.9	*76*	*53*
Eagle	151.8	106.2	90.7	58.3	*85*	*55*
Kamloops	176.9	117.3	111.7	108.4	*95*	*92*
Nehalliston	167.1	120.3	98.1	58.7	*82*	*49*
Nicola	164.6	137.4	127.6	105.4	*93*	*77*
Niskonlith	115.7	87.9	76.0	74.5	*86*	*85*
North Thompson	198.6	142.0	91.3	98.6	*64*	*69*
Okanagan	363.1	259.2	222.0	171.0	*86*	*66*
Raft	187.4	133.0	119.9	112.9	*90*	*85*
Salmon Arm	57.1	40.5	32.0	39.3	*79*	*97*
Shuswap	234.3	173.4	124.4	110.2	*72*	*64*
Similkameen	315.9	248.1	213.2	150.6	*86*	*61*
Spallumcheen	401.5	322.1	274.6	253.6	*95*	*79*
Yalakom	321.4	231.8	179.1	88.0	*77*	*38*
total	3,440.8	2,678.5	2,226.4	1,832.3	*83*	*68*
Nelson Forest District						
Arrowhead	67.2	60.0	42.9	51.7	*72*	*86*
Cranbrook	330.8	248.3	199.8	174.2	*80*	*70*
Creston	176.9	136.2	101.0	85.2	*74*	*63*
Edgewood	100.0	71.1	67.2	59.6	*95*	*84*
Fernie	260.0	200.2	73.0	116.2	*36*	*58*
Granby	162.9	115.7	82.3	56.8	*71*	*49*
Kettle	204.6	145.4	127.8	118.4	*88*	*81*
Kinbasket	374.7	310.3	241.0	183.8	*78*	*59*
Lardeau	497.1	366.2	142.5	114.9	*39*	*31*
Nakusp	88.6	62.9[8]	54.3	53.8	*86*	*86*
Salmo	175.2	124.5	102.0	79.1	*82*	*64*
Slocan	132.9	86.5	70.4	37.0	*81*	*43*
Upper Kootenay	225.3	166.5	136.7	128.6	*82*	*77*
Windermere	118.6	90.1	61.0	45.0	*68*	*50*
total	2,914.8	2,183.9	1,501.9	1,304.3	*69*	*60*

[1] In 1975, as approved by the Chief Forester. Except as qualified in footnotes 6 and 8, these figures correspond to the net indicated allowable annual cut; i.e. gross calculated allowable cut less non-recoverable losses.

[2] Annual rates of harvest authorized under contracts at July 2, 1975.

[3] Average of volumes scaled in 1973, 1974, and 1975.

[4] Harvest in 1973.

[5] Under review.

[6] Exceeds net indicated allowable annual cut by 42.3 thousand cunits.

[7] Included in Big Bar, Cariboo Forest District.

[8] Exceeds net indicated annual allowable cut by .9 thousand cunits.

Source: Compiled from data provided by the B.C. Forest Service.

REVISIONS

The Forest Service's objective is to obtain inventory data to a standard known as "Class B Unit Standard Survey" for calculating allowable annual cuts for the Public Sustained Yield Units.[25] This objective is met for all the units in the Kamloops and Nelson Forest Districts. In the Vancouver, Prince George, and Prince Rupert Districts all units have been surveyed to the "Class B Unit Standard", but a number of allowable annual cut recalculations to these standards are still in progress and current allowable cuts are based on earlier Maintenance or Pre-maintenance Surveys.

Once the allowable cut for a unit has been calculated to this desired standard, the intention is to recalculate it completely every ten years based on a reinventory of the unit. However, the Inventory Division's programme has fallen behind its planned schedule in recent years and recalculations have been made at 12- to 15-year intervals.

If conditions in a Public Sustained Yield Unit suffer some dramatic and unforeseen change, the allowable annual cut is completely recalculated. Thus, a catastrophic fire or insect infestation, or the withdrawal of large acreages from timber production for recreational or other purposes, can initiate such a revision. For example, the allowable annual cut of the Ashnola Public Sustained Yield Unit in the Kamloops Forest District is due for recalculation following the recent withdrawal of 186,000 acres for the expansion of Cathedral Provincial Park.

Finally, the Forest Service's new programme of designating Environmental Protection Areas should be noted, because these are expected to have a significant bearing on the calculation of allowable annual cuts in the future. The objectives of this programme are to identify and delineate areas which should be considered for withdrawal, or the deferral or modification of harvesting plans, because of their sensitivity. Environmental Protection Areas include:[26]

i) Areas of sensitive or unstable soils, owing to the character of the soil itself or steepness of the terrain.

ii) Areas with high non-timber values, such as community watersheds, and areas that have high fisheries, wildlife, or recreational value.

iii) Areas presenting forest management problems, such as inoperable terrain, snow chutes, and other unstable areas, or lands that pose special reforestation difficulties.

The lines delineating these problems are flexible and reflect the "environmental, technological, social, economic and political constraints in force and projected to the foreseeable future" at the time of their demarcation.[27] They will be reassessed during the reinventory of each unit, or more frequently, if necessary. In addition to providing planning guidelines to the field forester, Environmental Protection Areas will allow the Forest Service to estimate the impact on allowable cuts of special silvicultural treatments necessary for sensitive sites and areas where uses other than timber production have priority.

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[25] Forest Inventory Division sampling procedures and standards are fully described in the Division's Classification and Sampling Manual, Volume and Decay Manual, and Growth Manual.

[26] B.C. Forest Service, *Forest Inventory Environmental Protection Guidelines, 1976* (currently in draft form).

[27] *Ibid.*

Procedures in Other Regulated Units

The allowable annual cut for Tree-farm Licences is calculated by the licensee, subject to Forest Service approval. The Tree-farm Licence contract permits the licensee to use any method of calculating the allowable cut which is acceptable to the Forest Service. Deviations from Forest Service procedure are allowed when a licensee can demonstrate that such deviations are technically sound and are related to conditions of the individual licence. In practice, most licensees adopt the same method as that used by the Forest Service for Public Sustained Yield Units.

Some licensees have developed their own growth curves or local yield tables instead of relying on those of the Forest Service, and in some cases assume rotation ages different from those used by the Forest Service in similar conditions. Other variations are also approved in individual cases, such as different definitions of mature stands; differences in the species included; and minor variations in the utilization standards assumed in calculating the yield. Tree-farm Licensees do not make adjustments for "non-recoverable losses" as the Forest Service does for Public Sustained Yield Units. Since the land is by definition allocated to forestry use, no reductions are normally made for expected alienations, and little or no allowance is made for regeneration delay. It is assumed that timber damaged or removed from rights-of-way will be salvaged, so little if any reduction is made for fire losses, blowdown, or road losses. The approved allowable annual cut for each Tree-farm Licence is indicated in Table D-3.

Owners of Taxation Tree Farms can choose any method they wish to calculate the allowable cut for their lands, although, as described previously, all proposed working plans must meet with the approval of the Forest Service and the British Columbia Assessment Authority. Many different methods of allowable cut calculations are used, and owners are encouraged to be innovative.

Table D-3

APPROVED ALLOWABLE CUTS FOR TREE-FARM LICENCES

Tree-farm Licence number and name	approved allowable annual cut[1]	current harvest[2]	*fraction of approved allowable cut harvested*[3]
	thousands of cunits		*per cent*
Vancouver Forest District[4]			
2. Duncan Bay	460.7	239.7[5]	*52*
6. Quatsino	469.4	354.6	*76*
7. Salmon River	190.0	158.6	*83*
10. Toba	64.0	48.6	*76*
12. Hardwicke	25.0	22.4	*90*
17. Knight Inlet	73.4	64.9	*88*
19. Tahsis	302.0	300.5	*100*
20. Tofino	460.0[6]	356.3	*77*
21. Alberni	770.0[6]	596.7	*77*
22. Maquinna	363.0	325.0	*90*
25. Naka	236.0	176.5	*75*
26. Mission Municipal	11.4	10.3	*90*
27. Nitinat	40.6	46.1	*114*

Table D-3—*Continued*

Tree-farm Licence number and name	approved allowable annual cut[1]	current harvest[2]	*fraction of approved allowable cut harvested*[3]
	thousands of cunits		*per cent*
Vancouver Forest District[4] —*Continued*			
36. Cordero	31.1	22.8	*73*
37. Nimpkish	404.0	365.3	*90*
38. Squamish	93.0	83.4	*90*
39. Haida	1,250.0[6]	1,081.7	*87*
total	5,243.6	4,253.4	*81*
Prince Rupert Forest District[4]			
1. Port Edward	720.0	589.1	*82*
24. Moresby	154.0	138.1	*90*
41. Kitimat	312.0	126.4	*41*
total	1,186.0	853.6	*72*
Kamloops Forest District			
9. Okanagan West	74.3	56.9	*77*
15. Inakeep	29.3	23.1	*79*
16. Monte Lake	45.2	29.5	*65*
18. Clearwater	58.0	64.9	*112*
32. Bolean	12.0	9.0	*75*
33. Sicamous	10.1	9.0	*89*
35. Jamieson Creek	32.0	38.2	*119*
total	260.9	230.6	*88*
Nelson Forest District			
3. Little Slocan	44.6	34.3	*77*
8. Boundary Creek	53.3	56.9	*107*
13. Bull River	12.7	9.9	*78*
14. Spillimacheen	40.8	36.8	*90*
23. Arrow Lakes	415.0	318.2	*77*
total	566.4	456.1	*81*
Cariboo Forest District			
5. Mackenzie-Cariboo	47.6	47.1	*99*
Prince George Forest District			
30. Northwood	149.0	149.4	*100*

[1] As in 1975.

[2] Average of the volumes scaled in the 5-year period 1970 to 1974.

[3] These percentages are not a reliable indication of performance, because they relate the average harvest over 5 years to the allowable cut in 1975, which in some cases differs from that of preceding years.

[4] Parts of T.F.L. 2, 25, and 39 are in both the Vancouver and Prince Rupert Forest Districts. In this table they have been attributed entirely to the Vancouver Forest District.

[5] Harvest in 1974. Harvest not regulated in previous years.

[6] Excludes a small amount of thinnings.

Source: Compiled from information provided by the B.C. Forest Service.

TECHNICAL SHORTCOMINGS

The basic concept of sustained yield, and the method of harvest regulation used by the Forest Service in particular, have been subjects of increasing controversy in recent years. At the risk of some oversimplification, it can be said that debate has developed on two levels. First, as pressures on the allowable annual rates of cutting have grown, forestry experts in industry, the universities, and the public service have become increasingly critical of the Forest Service's calculation procedures and methods of enforcement. These criticisms are directed to the quality of basic data, the appropriateness of adjustments and allowances, inconsistencies in methods of reconciling harvests with the inventory, difficulties arising from enforcement procedures, and so on. Generally, these arguments are not about the basic objectives of the policy but rather the processes of implementation. These technical problems are reviewed in this section of this Appendix.

On another plane, the basic tenets of the sustained yield policy itself are being questioned. Economists and business analysts in British Columbia and elsewhere are becoming increasingly concerned about the practicability of attempts to maintain a more or less equal annual flow of raw material, and about whether the public interest is best served by such policy objectives. These more fundamental concerns are not dealt with here, but are discussed in Chapter 17.

Most of the technical criticisms of the Forest Service's cut control policies are articulated in the context of arguments about whether the allowable annual cuts are too high or too conservative, in terms of the capability of the resource to support these harvest rates in perpetuity. The arguments reviewed here are thus preconditioned on acceptance of the traditional goal of maintaining a steady yield of timber in perpetuity. Conclusions about whether the resulting allowable cuts are too high or too low are valid only in this context; in light of alternative policy objectives, discussed in Chapter 17, the conclusions might be quite different.

The alleged technical shortcomings of the Forest Service's harvesting controls are many and varied. For expository purposes they are discussed here under three heads: definition of the timber base; calculation of the allowable cut; and enforcement procedures.

DEFINITION OF THE TIMBER BASE

The calculated allowable cut for any management unit obviously depends in the first instance on the amount of forest cover that is considered harvestable. This raises questions about the precision of the forest inventory, assumptions about the merchantability of stands and species, and the standards of utilization to be adopted. In addition, since the issue is basically one of long-term planning, the way in which expected changes in the extent of exploitable timber are incorporated into the calculation has a critical impact on the results.

The latter can hardly be overemphasized. The calculations reflect expected harvestability over a full rotation, and the dramatic implications of changing circumstances over such a long period are illustrated by a comparison of conditions today with those of a rotation ago—about the turn of the century. If the allowable cut calculations were applied then to the timber inventory that was expected to be merchantable at that time, the harvest projected for 1976 would be a tiny fraction of the present rate of harvesting. And if that rate actually had been enforced, the social and economic growth of the province could not have occurred to the extent that it has. Indeed, technological and economic changes that have taken place since the introduction of sustained yield policies have rendered calculations of allowable annual cuts obsolete, as evidenced by the substantial increases that accompanied the shift to "close utilization" standards and the multifold increases in the allowable cuts for many Tree-farm Licences since they were first calculated.

Thus, some assumptions about trends in merchantability over the long-term future are required, and for such prognostication there is no alternative to subjective judgment. Obviously, in the face of historical evidence and the current pace of change, it would be folly to assume that only timber that is now within the margin of merchantability will be harvestable in the future. At the other extreme, it would be foolhardy to expect that every cubic foot in every tree on every remote mountainside will be recoverable. Moreover, it cannot reasonably be expected that new, managed stands will follow the same pattern and rate of growth as natural stands.

The Forest Service is accused, by some, of excessive conservatism and, by others, of unjustified optimism in its assumptions about the future availability of timber, particularly from Public Sustained Yield Units. In the past, certainly, most recalculations have yielded increases in allowable annual cuts—often very substantial increases—implying that they had been based on excessively conservative estimates of the resource base. The increases are attributable to a variety of factors, including: upward revisions of early estimates of recoverable volumes in mature stands, inclusion of stands and species previously not considered to be economically recoverable, revisions of estimates of site productivity, and closer standards of utilization. To the extent that harvesting limits thus failed to anticipate the changes in information, technology and economic conditions that produced these increases, timber production in the past (particularly during the early 1960's) was constrained at a level lower than that consistent with sustained yield objectives.

It is difficult to quantify the losses that have resulted from unduly conservative harvesting limits because they are manifest in a variety of forms: foregone stumpage and tax revenues, slower industrial growth, alteration of the regional pattern of development, delayed rehabilitation of old-growth stands and new growth, and so on. Indeed, it is difficult to determine with much precision the impact of past timber supply constraints on the rate of industrial expansion, although the available evidence suggests it may have been substantial. In the more developed Public Sustained Yield Units and Tree-farm Licences, the volume harvested closely followed increases in the allowable annual cuts. The constraining influence of cutting limits has been particularly conspicuous in reductions of timber allocations in some units to conform to the initial allowable cut, in the quick expansion of activity that took up the increases associated with closer utilization in the Interior, and in the continuing pressures on the allowable limits in some management units.

Today, however, there is increasing anxiety about excessive optimism in the Forest Service's approach to cut control. Since 1964, the inventory on which the calculations are based has included all species and forest types and all site quality classes on all productive forest land. Thus, in contrast with earlier inventory practice, effectively all forest is included without regard to its accessibility. Further, although volumes are estimated to various utilization specifications, the allowable cut determinations are now invariably based upon "close utilization" standards for all trees larger than 7.1 inches d.b.h. in the Interior and 9.1 inches d.b.h. on the Coast. Growing numbers of foresters believe that significant areas included in this resource base are not only impossible to log economically today, but because of inaccessibility and low timber quality will remain unharvestable over the first rotation and perhaps indefinitely. Some hold that the long-term patterns of forestry will follow the trends in agriculture, with increasing intensity of management on the more productive and accessible sites and withdrawal from marginal areas. Others, more concerned with environmental protection, argue that many steep, high, and otherwise sensitive sites cannot be logged without lasting damage and so should be excluded from the inventory. Still others are convinced that the standards of utilization assumed are unrealistic, particularly in the more decadent forests. These arguments suggest that the sustainable harvest rates determined by the present methods are exaggerated, and will lead to a future shortfall in timber supply.

Much of the controversy surrounding allowable annual cut estimation ultimately revolves around its reliance on physical, rather than economic, criteria in defining the resource base. The total volume of timber is not, of course, a measure of what can be economically recovered. The merchantability of a stand depends on a host of factors other than its volume, such as its quality, distance from markets, accessibility, terrain, and exogenous variables like the state of technology, product prices, and industrial costs. A stand with a meagre volume may be unfeasible to harvest in a remote location, but valuable if it is close to a utilization plant; and even a very heavy stand may be unrecoverable if it is small and inaccessible.

The present reliance on physical criteria is undoubtedly due to their greater amenability to measurement, predictability, and constancy; but the failure to take account of economic variables is a major shortcoming of allowable cut calculations. Examples of this preoccupation with physical measures are numerous: the lack of distinction between accessible and inaccessible stands, inclusion of all species regardless of their present or anticipated merchantability, uniform assumptions about utilizable tree sizes over widely varying forest types and conditions, the exclusion (since 1974) of all "low" sites and sites that grow less than 11 cubic feet per acre per year regardless of their value, and so on.

This is not to imply that the scope for harvesting should be constrained only by merchantability, for there are often environmental considerations at stake and it may be in the public interest to harvest and rehabilitate unmerchantable forests. But it does imply that realistic calculations of the future wood supply should rest not only on a physical inventory but also on current and expected trends in economic and technical constraints that govern the recoverability of timber.

The Calculation Procedure

The process of calculating the allowable annual cut for a managed unit has been explained earlier in this Appendix. The essential elements are, first, the application of the Hanzlik formula to every forest type and site class in the unit to obtain an allowable annual cut for each. The total of these, or the tentative allowable cut for the unit, is then divided into the total volume of timber available for harvesting, which is the sum of all mature volumes and the volumes that immature stands are expected to contain at the age of maximum mean annual increment. The resulting indicated rotation is thus the weighted average of the number of years it takes to reach the age of maximum mean annual increment for all stands.

The next step is the Area Volume Allotment check, which reconciles the tentative allowable cut with the expected volume in each age class at the time it is scheduled for harvest.[28] This revised cut is then adjusted in recognition of anticipated losses or gains in productive land area and merchantable volume during the rotation, to yield the indicated allowable annual cut.

The main issues of contention in this procedure are fourfold: the determination of the rotation period; the recognition (or non-recognition) of the implications of transition from old-growth to second-growth forests, specifically, the age class distribution and "fall down" problem; the allowances for "non-recoverable losses"; and the allowable cut reserved by the Forest Service. These are considered briefly in turn.

The rotation period. Given the total volume of timber and its rate of growth in a unit, the length of the rotation period selected is the critical variable in the allowable cut calculation. Since the rate of depletion of mature timber is calculated as its total volume divided by the number of years in the rotation, a longer or shorter rotation will alter its annual rate of cut in inverse proportion. The greater the proportion of mature forest in a unit, the more sensitive the total allowable cut is to the rotation period.

The Forest Service selects that rotation for each stand which will, according to the appropriate growth curve, maximize the mean annual increment as second-growth crops are grown. It must be emphasized that this choice is not the only one that will permit a steady yield from a regulated forest; the yield can be sustained at any level within the forest's maximum physical potential.

The age of culmination of mean annual increment, as indicated by the growth curves, depends on the utilization standards assumed in estimating the recoverable volume of stands. Closer standards of utilization indicate greater volumes at each age, and because they include smaller trees and pieces, the culmination of mean annual growth is reached sooner. Thus rotation ages have been shortened, resulting in higher allowable annual cuts, as recalculations have been based on assumptions of closer standards of utilization over the years.

A fundamental criticism of the rotation decision is, again, the failure to take account of basic economic criteria. It is, unquestionably, a most important economic issue, since the rotation length determines the number of years before investments in new crops yield their return, the size of the forest inventory, to some extent the logging and manufacturing costs that vary with log size, as well as the rate of current harvesting. But no attempt is

[28] The Forest Service makes no allowance for growth in mature stands between the time of measurement and the date of harvesting (although this may be several decades) on the assumption that growth will be offset by decay and mortality. This may or may not be justified, depending on the age, species composition, and condition of the stand concerned. The yield of immature stands is projected beyond culmination age to the age of harvesting. However, the yield used is taken to be the volume at the beginning of the period over which the presently immature stands will be cut (rather than the mid point of the period) and so is conservative.

made to identify the relation between values and stand age; the solution is based entirely on physical criteria.

A good deal of research in recent years has been directed to the economic consequences of the rotation period.[29] The economic value of a stand increases with its age and then declines, following a different pattern from the growth curve, because the value per cunit of wood increases with its size while the costs of harvesting it decline. Moreover, an economic solution aimed at maximizing the long-term value of the forest yield must take account also of the capital costs of carrying forest inventories and the postponement of new growth as mature stands are carried forward. Typically, such analyses indicate that the rotation period that will maximize the long-run value of a forest's yield is shorter than that which maximizes mean annual increment. Thus, consideration of the economic factors in the rotation decision would almost certainly increase allowable cuts during the transition period as old-growth timber is converted to new growth.

The age class distribution. The total growing stock in any regulated unit is comprised of numerous timber stands, each having its own growth characteristics as represented by the relevant growth curves. A grouping of the stands into 10- or 20-year age classes with the number of acres in each provides a description of the age class distribution. (Table D-1, columns 1 and 3.) Typically, some age class groups will comprise a much larger or smaller proportion of the total than others. Regardless of the means used in the determination of rotation ages, the implication is that each stand should be harvested at its particular rotation age. Where the age class distribution is very irregular, as is so frequently the case in British Columbia, strict adherence to a harvesting regime determined on that basis would entail wide fluctuations in harvesting rates, which of course would conflict with the objective of steady yields. The alternative of evening out the harvesting rates entails various combinations of holding some stands beyond their rotation age and cutting others before they reach it. These deviations from the age of culmination of growth rates inevitably sacrifice some of the potential yield.

The "fall down" problem. Some critics of the Forest Service's allowable cut calculation procedure are concerned that it fails to recognize the inevitable reduction in the harvest rate as the stock of old-growth timber is depleted. The argument is that indicated allowable cuts are currently high because of large volumes in natural stands that have grown much longer than the rotation period planned for subsequent crops. Thus, as management units are converted to new stands, the calculated allowable cuts must fall short of their present levels which are based on inventories that include large stocks of old-growth timber. This is the so-called "fall down" problem.

The argument is well taken. The present volumes of old-growth timber in many stands are considerably higher than the volumes that are predicted for new stands on those sites at the age of culmination of mean annual increment according to the relevant growth curves. For example, a rough calculation of the allowable annual cut for the Public Sustained Yield Unit represented in Table D-1, after the old-growth inventory is exhausted, suggests that it will be some 25 per cent less than the current level.[30] It is therefore, quite proper to conclude that although the whole policy is based on the concept of a steady harvest in perpetuity, allowable cut calculations cannot be expected to yield consistent results over the transition from old-growth to second-growth harvesting.

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[29] See, for example: M. M. Gaffney, *op. cit.;* W. R. Bentley and R. E. Teeguarden, "Financial Maturity: A Theoretical Review", *Forest Science* 11(1), 1965, pp. 76–87; and P. H. Pearse, *op. cit.*

The difficulty arises in the inferences drawn from this observation. Some suggest that the "fall down" contravenes the sustained yield objective of steady yields and, therefore, current allowable cuts should be reduced to avoid the eventuality of future reductions. As a general matter, such a recommendation is difficult to justify.

In the first place, the anticipated "fall down" varies widely, depending upon the condition of the current old-growth stands and the productivity of the sites they occupy. In some areas, very decadent old-growth timber occupies sites of potentially high productivity, so that the volume of second crops at harvest age can be expected to exceed the current old-growth volumes. In units that contain extensive tracts of such decadent timber today the anticipated "fall down" may be negative.

In the second place, the total predicted "fall down" in harvest rates will not be felt for many years—indeed for several decades—in many of the Public Sustained Yield Units. In the Public Sustained Yield Unit referred to above, for example, the estimated "fall down" will not be fully realized for more than 90 years. It is not unreasonable to expect that in this period silvicultural practices and utilization technology will advance sufficiently to offset the predicted decline. During this 90-year transition period, successive recalculations of the allowable cut will effect the adjustment gradually. With each recalculation the Area Volume Allotment Check will be extended through the ensuing rotation, and as the old stands are cut, their effect in the calculations will progressively diminish.

Finally, and more fundamentally, a reduction in present harvest rates in order to avoid a future decline cannot be regarded as protection against the costs of adjustment to lower allowable cuts; it will simply shift these costs from the distant and uncertain future to the present. Worse, it will delay new growth in areas currently occupied by stagnant stands and postpone the realization of their values. Such a proposal cannot, therefore, be defended on economic or social grounds or in the interests of forest productivity. This obviously raises more basic questions about planning for steady harvest rates over the infinite future.

Non-recoverable losses. The allowances made in the gross allowable cut for anticipated withdrawals of productive lands and losses in recoverable volumes over the rotation have already been briefly explained. These are a highly contentious part of the allowable cut determination.

The reductions ascribed to expected withdrawals of land from timber production over the rotation are inevitably speculative, and the Forest Service may tend to err on the generous side. But even if the predictions are borne out, the reductions in the allowable annual cut are excessive because they are based on the assumption that all the withdrawals are already made, even though they are likely to be spread over the rotation period. A more appropriate assumption may be that the withdrawals will occur evenly over the rotation, or at its midpoint. Alternatively, they might be accounted for in revisions of the allowable cut only after they actually take place. Any of these alternatives would reduce the deductions in the present and hence raise the indicated allowable annual cut.

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[30] The maximum mean annual increment for stands in the Quesnel Lake Public Sustained Yield Unit averages about 34 cubic feet per acre, with a total productive area of 1,536,854 acres; the long-term gross sustained yield is about 522,530 cunits annually. This is a reduction of some 25 per cent below the current gross allowable cut of 685,340 cunits.

Deductions for logging roads are also made in much the same way as to imply that they all are already lost from the productive area, and again a more realistic assumption may be that they will occur evenly over the rotation. Further, there is no recognition of probable harvests of timber on rights-of-way, logging roads, and burned areas.

The losses attributed to regeneration delays are based on the assumption that the full allowable annual cut will be harvested each year and a corresponding area will be denuded, even though the annual allowable cut is not fully allocated in most units, and the areas actually logged rarely approach the implied maxima. In summary, all the allowances for non-recoverable losses appear to involve an upward bias, thus imputing a conservative bias in the indicated allowable annual cut.

Forest Service "reserves". Although generous allowances are made for non-recoverable losses to arrive at the approved allowable cut, the government rarely allocates harvesting rights sufficient to realize that rate. In 1975, for example, allocated timber rights authorized less than two-thirds of the approved allowable cut in Public Sustained Yield Units.[31] The unallocated portion of the approved cut is unofficially described as the "reserve".

The "reserve" portion of the approved allowable annual cut for the Public Sustained Yield Units in each of the Forest Districts is as follows:

Forest Districts	"reserve" portion of approved allowable cut in Public Sustained Yield Units
	per cent
Vancouver	18
Prince Rupert	62
Prince George	38
Cariboo	24
Kamloops	17
Nelson	47

The explanation for such large reserves is not entirely clear. In some regions, such as the northern part of the province, they may represent volumes in excess of current demands. In other cases reserves are apparently held as a precaution against future contingencies, such as withdrawals of lands from timber production even though, as described above, provision for such deletions is already made as non-recoverable losses.

The most common rationale for the reserves is that they represent that portion of the inventory included in the allowable cut estimates that is currently submarginal. But this is a *non sequitur*. Any submarginal stands that are included in the allowable cut calculation are, by definition, expected to become harvestable during the rotation. The entire allowable cut therefore can be taken at present from stands that are currently harvestable. Indeed, if this is not done, an excess of old timber will be carried forward and the pattern of conversion to new stands projected in the calculation itself will not be attained.

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[31] Outstanding rights in Public Sustained Yield Units authorized an allowable cut of 14.2 million cunits in 1975, which is 62 per cent of the approved allowable cut of 23.0 million cunits, and only 48 per cent of the gross allowable cut of 29.8 million cunits (i.e. before non-recoverable losses). (See Tables D-2 and 17-2).

DIRECTIONS OF BIAS

This brief commentary is sufficient to indicate that the data and procedures used in determining allowable cuts involve a variety of possible biases and sources of error. Whether these result, in the aggregate, in over-estimates or under-estimates of the allowable harvest is a matter of considerable importance; and even more critical is the question of whether the current allocations of timber exceed or fall short of appropriate levels. With present data limitations it is not possible to throw much empirical light on this issue, nor to generalize about likely magnitudes across widely varying sustained yield units. Nevertheless, some indication can be offered about the directions of bias arising from some of the elements of the cut determination procedure.

To do this, it is necessary to have an explicit norm against which bias or error can be identified. For present purposes, this norm will assume the objective implied in the general allowable cut formula: that is, to prescribe an annual rate of harvest that can be sustained over a period of one rotation, and which is capable of creating, by the end of the rotation, a forest structure that can yield a steady harvest of new crops thereafter. Clearly, the accuracy of the result depends on: the precision of data about the forest inventory, its harvestability, and productivity; the actuality of predictions of rates of growth, utilization, land withdrawals, and timber losses; and the degree to which the assumed harvest rates (that feed back into the estimates of future stand structures) are realized.

First, it is possible to identify several elements in the system that can be expected to impute an upward bias in allowable cuts.

i) Most importantly, the inventory, including as it does all timber on almost all productive forest land regardless of species, quality, accessibility, or site sensitivity, undoubtedly exaggerates the volumes that can feasibly be recovered.

ii) The uniform assumption of recovery to "close utilization" standards almost certainly over-estimates the volumes that will be realized from some decadent stands.

iii) In certain cases, the assumption that second-growth stands will grow at a rate as high as the mature stands which they replace may be unduly optimistic, because of site deterioration, poor reforestation, or the incursion of unmerchantable species.

On the other hand, the allowable cut can be expected to be biased on the conservative side by a number of factors.

i) The best inventory data for some management units is very old, having been compiled in some cases more than 15 years ago, when different standards of recovery and utilization were current. Revisions of very old surveys usually indicate higher volumes of timber.

ii) Allowances for some non-recoverable losses appear to be generous and are unrealistically deleted in total from the unit at the beginning of the planning period. No account is taken of timber that can be expected to be recovered from areas withdrawn from forest use. The area assumed to be unproductive pending regeneration is clearly exaggerated, and progress in planting after logging can be expected to actually reduce the number of years to rotation age below the rotation period for natural stands in many cases.

iii) The unallocated allowable cut is, in all Forest Districts, substantial.

Both (ii) and (iii) above have the effect of leaving a greater volume for future harvesting than is assumed in the allowable cut calculation itself.

iv) The general exclusion of all "low" sites and sites that are expected to produce less than 11 cubic feet annually over the rotation undoubtedly eliminates some harvestable timber.

v) General technological and economic trends suggest that the standards of utilization, in some stands at least, will be closer than the current "close utilization" standard by the end of a rotation period.

vi) Many mature stands continue to add increment, but this growth is not recognized. Nor is any account taken of the growth in second-growth stands beyond rotation age during the period that these age classes are to be harvested.

vii) The productivity, or site quality, of lands occupied by mature timber is often under-estimated (according to some observers).

viii) Growth estimates are based on samples of wild stands, although managed crops are expected to add volume more quickly in many cases.

ix) The rotation age selected in all cases ignores economic factors in the timber production process which, if considered, would typically call for shorter rotation periods.

The net balance of these positive and negative influences on allowable cuts undoubtedly varies considerably among the sustained yield units in the province.

ENFORCEMENT OF CUT CONTROL

The approved allowable annual cut for each management unit must be translated into controls on the holders of harvesting rights to ensure that their harvests will conform to the prescribed cutting limits. This is accomplished by provisions under the various tenure contracts that limit each licensee's rate of cutting and subject him to penalties if he deviates from those limits.[32] Again, the arrangements are the most complicated in the Public Sustained Yield Units, where typically, several licensees hold harvesting rights. These are considered first.

PUBLIC SUSTAINED YIELD UNITS

Contractual provisions in the several varieties of Timber Sale Licences provide the necessary legal authority for regulating licensees' harvest rates in the Public Sustained Yield Units. However, as explained in the body of this report, each established licensee in a unit has an informal "quota position" in terms of an allowable annual cut which he holds under one or more licences, each of which authorizes an allowable annual cut. The controls on his cutting rate from year-to-year, as described in the following paragraphs, are applied not to his individual licences but to all of his "quota" rights in a unit taken together. "Third band" Timber Sale Licences, which are not part of a licensee's "quota", are treated separately for cut control purposes.

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[32] Cut control procedures and policy guidelines are described in B.C. Forest Service, *Forest Management Manual*, Chapter 19. The procedures are complex and comprehensive, and only a brief outline is presented here.

The relevant cut controls are prescribed limits to the licensee's flexibility in deviating from his allowable annual cut in a unit. An account is kept of all the timber he harvests in each calendar year, and this is compared with his allowable annual cut. Only certain minor volumes are excluded from this accounting, such as salvage sales, pulp timber sales, or sales of residual volumes and special products (but not poles). All other harvesting is recorded for cut control purposes, including timber cut in trespass, timber cleared from rights-of-way, and unrecovered timber which the licensee should have removed under the terms of his contract.[33]

Cut controls are fixed in terms of annual and 5-year limits.[34] Each licensee must harvest within 50 per cent of his allowable annual cut in any one year and within 10 per cent of the total allowable cut for each 5-year period. Responsibility for enforcing these controls rests with the Forest Service's Administration Division.

Each year, every established licensee is notified of his cut for the past year, as recorded in official scales, and of the indicated average rate of cut for each of the remaining years in his 5-year control period. If he is in violation of either his annual or 5-year cut control limits he is so informed, appraised of the penalties, and requested to explain the reasons for this state of affairs. The procedure and penalties associated with violations are as follows:

i) If he cuts more than 150 per cent of his allowable annual cut prior to the end of the year, his harvesting rights can be suspended until the end of that year or longer depending upon the extent of overcutting.

ii) If he overcuts the 150 per cent limitation by the end of the year but has not cut more than double the allowable annual cut, he is warned that he is violating cut control requirements and an operating plan for the remaining years in the 5-year control period is requested by the District Forester. If his cut is more than twice the allowable annual cut in one year, then all his harvesting rights may be suspended.

    A penalty of double stumpage on the volume removed in excess of 150 per cent of the allowable annual cut may also be levied. However, this can be—and in fact frequently is—waived by the Chief Forester, depending on the merits of the case. A penalty levied for overcutting in one year may be refunded if the actual cut is within 10 per cent of the allowable cut after 5 years.

iii) If, over the 5-year control period, he cuts between 100 per cent and 110 per cent of his total allowable cut, he is warned that the overcut from the current 5-year period should be compensated by a corresponding reduction in the cut over the next 5-year period.

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[33] See Chapter 18 of this report for an explanation of cut control accounting.

[34] Annual cut control is waived in favour of 5-year periodic control for very small licensees—i.e. those with allowable annual cuts of 3300 cunits or less on the Coast and 650 cunits or less in the Interior. However, such licensees must not cut more than 500 thousand cubic feet on the Coast or 100 thousand cubic feet in the Interior in any one year, or 5 times the allowable annual cut, whichever is the lesser.

iv) Where he violates the 5-year cut control requirements (i.e. over 110 per cent of the allowable cut) prior to the end of a 5-year period, all of his operations may be suspended until the end of the 5-year period, or longer if considered necessary.

v) If he cuts more than 110 per cent, but less than 120 per cent, of his allowable cut by the end of a 5-year period, he receives a warning and must submit an operating plan to the District Forester describing how he intends to restore balance between his actual and allowable cuts. If he has cut more than 120 per cent of his total allowable cut at the end of a 5-year period, all his sales are suspended for at least one year. A penalty of double stumpage on the volume removed during the 5-year period in excess of 110 per cent of the allowable cut may also be levied, as in the case of annual overcutting.

vi) If he cuts less than 50 per cent of his allowable annual cut in any year, he is warned that continued undercutting may result in a reduction of his allowable annual cut.

vii) If he cuts between 80 per cent and 100 per cent of his allowable cut over the 5-year control period, he is advised that an undercut up to a maximum of 10 per cent can be compensated by a corresponding increased cut during the next 5-year period. Where the cut is less than 80 per cent of the allowable cut for the 5-year control period, the licensee is informed that reduction of his allowable cut will be considered. The decision to reduce an established licensee's allowable annual cut is taken by the Minister. If he has undercut because of labour disputes, weather or market conditions, his case is generally viewed favourably and no immediate reduction is recommended.[35]

In the case of "third band" Timber Sale Licences, cut control is simply an annual maximum equal to the allowable annual cut specified in the licence.[36] There is no minimum requirement or 5-year control period. If a "third band" Timber Sale Licence is overcut the licensee may be penalized, unless by mutual agreement the excess volume removed can be offset against undercutting of the licensee's ordinary Timber Sale Licences (if any) in the same Public Sustained Yield Unit. However, this procedure cannot be reversed when the "third band" licence has been issued deliberately for low quality timber.

TREE-FARM LICENCES

Legal authority for cut control under Tree-farm Licences is provided in the licence documents, which also specify penalties for non-compliance. Again, the controls are administered by the Administration Division of the Forest Service.

Cutting limits are, again, specified on annual and 5-year bases; the harvest under each Tree-farm Licence must be within 50 per cent of the allowable cut in any one year and within 10 per cent of the total allowable cut for any five consecutive years. Unlike licensees in the Public Sustained Yield Units, however, a Tree-farm Licensee may elect to start a new 5-year control period from any year in which the periodic cut from the preceding 5-year period is within 10 per cent of the approved allowable cut for that period.

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[35] It should be noted, however, that until the 1970 recession in lumber markets, market conditions were not considered to be a justifiable cause for deferring allowable cut reductions.

[36] In the Cariboo Forest District and parts of the Nelson and Kamloops Forest Districts, licensees are currently allowed to cut up to 110 per cent of their annual position of "third band" wood in any one year.

In the case of overcutting on either an annual basis (in excess of 150 per cent of the allowable cut) or on a 5-year basis (in excess of 110 per cent of the allowable cut), a penalty of double stumpage on the excess volume harvested is levied. In the case of undercutting (less than 50 per cent of the allowable annual cut or 90 per cent of the 5-year allowable cut), the penalty is the normal stumpage on the volume undercut. If the total cut over 10 consecutive years, including the 5-year control period in which allowable cut commitments were not met, varies less than 10 per cent from the total 10-year allowable cut approved in the working plan, the penalties levied for the first 5-year control period are refundable. Under no circumstances, however, are annual penalties refundable.

Unlike those that apply in Public Sustained Yield Units, these penalties are usually rigorously assessed. In a recent case, for example, a licensee was penalized for cutting 0.1 per cent less than the minimum allowable cut in one year.

TAXATION TREE FARMS

Because of the nature of Taxation Tree Farms, yield control—which is administered by the Co-ordinator of Timber Appraisal—is very flexible. These units differ greatly in size and age class composition, and many are incapable of being managed to produce annual yields at the present time. The Taxation Act requires that these units "be maintained in a state of continuous productivity",[37] but equal annual or periodic harvests are not required. Each owner must submit an annual report to the Assessment Authority's Timber Appraisal Co-ordinator describing the area and volume logged and the progress of reforestation and protection programmes.

Those Taxation Tree Farms that are included in Tree-farm Licences are treated as integral parts of the licences for cut control purposes, and are subject to the control regulations set out in the Tree-farm Licence. For those outside Tree-farm Licences, the Timber Appraisal Co-ordinator is guided by the general rules that the volume harvested should be within 50 per cent of the allowable cut annually and within 10 per cent of the total allowable cut for any five consecutive years. However, administration of these guidelines is very flexible, and owners of Taxation Tree Farms have the opportunity to take advantage of favourable market conditions or to reduce harvests during depressed markets. There are no provisions for penalties on owners of Taxation Tree Farms for deviations from harvest schedules, other than possible revisions to the tax base (see Chapter 13).

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[37] Taxation Act, s. 38.

APPENDIX E

RESTRICTIONS ON EXPORTS OF LOGS AND CHIPS

Throughout this century, and even before, forest policy in British Columbia has included measures to encourage manufacturing of timber within the province. Some forms of early timber rights have contractually obliged licensees to maintain manufacturing plants, and for a time incentives for domestic manufacturing were provided under royalty arrangements. But in 1901 the policy shifted to direct legislative restrictions on exports of unmanufactured timber cut from Crown lands, and this approach was applied to Crown-granted lands beginning in 1906. Today, these restrictions are imposed by both the provincial and federal governments, and confine exports of logs and chips to a very small proportion of provincial production. Because the policies and procedures relating to this matter are not documented elsewhere, this Appendix describes the current arrangements to provide background for the discussion and recommendations in Chapter 22.

POLICIES AND PROCEDURES

Control over exports of forest products from the province is shared between the federal and provincial governments, the federal Parliament having constitutional jurisdiction over international trade and the province having authority over its natural resources. The provincial government exercises its control under Part X of the Forest Act which provides: "All timber cut on Crown lands, or on lands granted after the twelfth day of March, 1906 . . . shall be used in the Province, or be manufactured in the Province . . .". It is to be noted that these provisions apply only to timber cut on lands under provincial title or granted by the province after the legislation was adopted in 1906, thereby excluding most of the existing private forest land. Moreover, they restrict exports of unmanufactured timber from the province without regard to whether the shipments are international or interprovincial.

The federal government's statutory power is contained in the Export and Import Permits Act which controls trade in a wide range of commodities between Canada and other countries. In contrast to the provincial controls, the federal policy relates to trade across the borders of Canada, without impinging on interprovincial trade. Furthermore it applies to all trade, whether covered by or exempted from the provincial controls. Timber cut from private lands Crown-granted before 1906 and from federal lands (such as Indian reserves) is subject to the federal restrictions only; this currently accounts for some 10 per cent of total harvest in the province. Timber cut from all other lands is subject to both federal and provincial export controls.

The export restrictions imposed under the federal Act and the chain of statutes leading to its passage originally were designed to serve national security objectives. Exports of goods having strategic value, and exports of any goods to certain nations, have been controlled for years; restrictions on logs and "pulpwood" (interpreted to include chips) date from World War II. Until then timber harvested from private lands granted by the Crown before 1906 could be exported from Canada without federal approval. After the war federal permits were issued almost without restriction but in 1969 administration was tightened to bring it into line with the provincial policy of promoting domestic manufacturing.

The latest amendments to the Act, passed in 1974, reflect this stance, indicating that an objective of federal export control policy is the promotion of natural resource manufacturing in Canada. It now provides that the federal government may control the export of certain commodities in order "to ensure that any action taken to promote the further processing in Canada of a natural resource that is produced in Canada is not rendered ineffective by reason of the unrestricted exportation of that natural resource.".

Mechanisms for Control

Having similar objectives, the federal government has harmonized its controls with those of the province by, in effect, endorsing export permits granted by provincial authorities and by applying similar criteria for regulating exports of timber that are not subject to provincial controls. As a result, the administrative restrictions that apply to timber from federal lands and early Crown grants are the same as those applied by the province to other timber, although the province also levies an export charge on timber subject to its controls. Shipments from British Columbia to other provinces are subject to provincial controls only, but these are of minor consequence because opportunities for such trade in unmanufactured timber are for the most part precluded by high transportation costs.

The controls of both governments are implemented by prohibiting all exports except those authorized under individual permits issued by the provincial Lieutenant-Governor in Council, and by the federal Minister of Industry, Trade and Commerce. Both receive advice from two committees—the Log Export Advisory Committee and the Chip Export Advisory Committee—which make recommendations on applications for the two most important commodities. Three types of export applications are not considered by these committees: for timber near provincial boundaries that cannot economically be utilized in the province, which are processed directly by the provincial Cabinet; for timber cut on Indian lands, which are usually authorized by federal authorities without committee review; and for shipments to other provinces of certain minor unmanufactured products like poles, posts, mine timber, Christmas trees, veneer and hog fuel. A fourth category, applications of an emergency nature (which sometimes arise in conjunction with ship scheduling problems), are also authorized directly by the provincial Cabinet but committee members are often consulted as well. But these special arrangements are relatively minor in relation to the importance of export applications for logs and chips considered by the two advisory committees.

The crucial task of these advisory committees is to determine whether individual export permit applications relate to logs or chips which are surplus to the requirements of domestic utilization plants. Only where the committee decides that the application meets this test will it recommend that the permit be issued. Neither committee is constituted formally under statute; they both function as informal groups set up to advise the provincial and federal governments.

Log Export Advisory Committee. The Log Export Advisory Committee is comprised of about ten members, representing various interest groups in the forest industry—lumber manufacturers, pulp producers, log exporters, logging contractors, shingle producers, labour, and others—and relevant government officials, one of whom functions as Chairman. It meets monthly, and each meeting is formally convened twice: first, to consider applications that fall under provincial control with a representative of the B.C. Forest Service serving as Chairman; and again, chaired by an official of the federal Department of Industry, Trade and Commerce, to consider the applications subject only to the federal regulations. Where the provincially-chaired committee recommends that an application for export out of Canada be approved, the federally-chaired committee invariably confirms it without giving it further scrutiny.

The criterion for determining whether logs proposed for export are surplus to the needs of domestic mills is, of course, critical. The committee is given no statutory guidance in this matter; it is free to use whatever means it chooses in arriving at its recommendation, and its *modus operandi* has recently changed. In the past, to satisfy itself that a permit application was for logs surplus to domestic needs, the committee required evidence that the logs had been placed on the log market for at least ninety days, that the applicant had offered them for sale to domestic mills that normally process logs of that type, and that no buyer was willing to purchase them. The minimum waiting period was reduced successively to sixty and then to thirty days to minimize deterioration in storage. As well, forthcoming applications were displayed in the Vancouver District Forester's office and circulated by the Forest Service among regular log purchasers. Any interested party who became aware of the intended export through these or other channels was permitted to make an offer for the logs. Three letters of refusal from acceptable domestic mills became the evidentiary standard that the logs had been offered for sale as required, and the absence of any offer to purchase the logs was treated as indicating that the logs were surplus to domestic needs.

These procedures—particularly the emphasis placed on the letters of refusal—eventually became a source of contention within the industry. Suspicion grew that letters of refusal were sometimes signed under duress, or obtained as consideration in bargains unrelated to the export application. Furthermore manufacturers became increasingly apprehensive that presenting letters of refusal might in some way prejudice their opportunities to obtain other logs or standing timber. There was no compulsion for the export applicant to actually sell the logs to the person who offered to purchase them. Particularly where he had devoted some effort to acquiring the logs with the intention of exporting them, he frequently chose to retain them and await a more propitious marketing opportunity. In those cases the offer to purchase served no purpose other than to block the approval of the export application. Such futile experiences discouraged prospective purchasers from making offers for such logs. As a result of the difficulties surrounding the letters of refusal and the offers to purchase this approach was recently abandoned.

Today, applicants for log export permits notify the District Forester of their intention to apply and then advertise their logs for sale according to specified procedures. After two weeks, the prospective exporter submits a formal application, submitting copies of his advertisement and any offers received to the District Forester. All such applications are forwarded to the Vancouver office of the Forest Service and subsequently to the Log Export Advisory Committee.

Whenever an offer is made on the logs, the committee recommends that the export application be rejected. It does not normally consider the reasonableness of prices offered, although applicants have appealed to the provincial Minister when negative recommendations have been based on offers which they have considered inadequate.

When the committee recommends that a provincial export application be granted, the Cabinet passes an Order-in-Council adopting the recommendation, and authorizing the District Forester to issue a permit once all relevant terms and conditions (such as payment of the timber tax, described below, and any other provisions suggested by the Forest Service) have been met by the applicant. The federal Minister confers a parallel power on his regional personnel.

Chip Export Advisory Committee. The Chip Export Advisory Committee deals with export applications for all wood residues, including sawdust and shavings as well as pulp chips. It is chaired by a representative of the Council of Forest Industries and its members are representatives of chip producers' and consumers' groups[1] with officials of the federal and provincial governments acting as observers. This committee meets regularly twice a year, more often if necessary. Incidental to its export advisory role, it functions as a forum for discussing and resolving chip supply problems.

The mechanisms of chip export authorizations are fairly straightforward. All applications for chip export permits are first referred to the Chip Consumers' Sub-Committee which represents all coastal consumers, mainly pulp mills. This group assesses the general supply situation and makes recommendations about the disposition of coastal export permit applications. On applications for export of chips from the Interior, the Consumers' Sub-Committee seeks the advice of a representative of the Interior pulp industry who, in turn, consults with consumers in that region.

The application and the recommendation of the Consumers' Sub-Committee are then considered by the Chip Export Advisory Committee. As with logs, where an export permit is recommended, the advice of this committee is submitted to the provincial Minister through the Forest Service, which adds comments and proposes conditions dealing with such things as volume limits, duration of the permit, and the appropriate timber tax to be paid (see below).

Permits bearing terms of one year or less stipulate a maximum total volume to be exported, and sometimes state maximum monthly rates of export in order to regulate more precisely the export flow. A few permits carry 5-year terms and several have terms of two years; these often prescribe both maximum monthly and annual rates of export. As with logs, chip export permits governing chips destined for markets outside Canada must also receive federal sanction, which is generally forthcoming whenever provincial approval is granted.

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[1] The industry groups have become institutionalized through the producers' and consumers' subcommittees of the Chip Export Advisory Committee.

The circumstances which will prompt the committee to advise the governments to issue export permits fall into three categories, *viz.;* specific volumes of products in temporary, emergency surplus; specific volumes of domestically unmarketable residue products; and products that are generally surplus to domestic needs, to be exported at some maximum rate for a finite period. All permits are non-transferable, and are subject to cancellation for violation of their terms and through the "notice of need" procedure described below.

In the event that a domestic pulp producer faces a shortage of chip supplies, a series of steps can be taken. First, the consumers, through the Chip Consumers' Sub-Committee, attempt to resolve the problem among themselves. If this is unsuccessful, the Producers' Sub-Committee is asked to try to arrange voluntary curtailments of exports. Failing this, the Chip Export Advisory Committee delivers to the Minister of Forests a "notice of need", which indicates the amount of the shortage and its anticipated duration. The "notice of need" is a request to the Minister to suspend spot permits and to curtail by some fraction the amounts authorized under other export permits. As a final measure, the Minister can notify holders of existing permits that their permits will not be renewed until the shortage is overcome.

Until recently, the "notice of need" provision was contained in all export permits, although it has been invoked in only one instance. In 1976 the government indicated its intention to consider long-term, non-interruptible export permits.

Again, the procedures are conspicuous for the lack of consideration given to price in assessing the balance between anticipated chip production and needs, although price obviously influences both supply and demand and a surplus or shortage is therefore meaningful only in terms of a given price. The committee is constrained in considering prices for fear of contravening anti-combines legislation, representing as it does a group of producers. Its inability to take account of prices nevertheless creates conflict between producers and consumers and makes it difficult to resolve differences.

THE TIMBER TAX

In addition to these administrative restrictions, exports that fall under the provincial controls are subject to a fee, referred to as the "timber tax", levied on exported products and payable by the exporter.

The levy on exported pulp chips has recently been increased to $1.50 per bone dry unit.[2] No attempt is made, it should be noted, to distinguish chips produced from timber subject to the provincial log export controls from that exempted. The charge on logs has been increased substantially in recent years. The original rate of 50¢ per cunit first was raised to 90¢, then to $2.00 in October 1973. In February of the following year several different rates were introduced to reflect the wide discrepancies between the export prices of different species: $2.00 per cunit for low-grade Interior pulpwood; $5.00

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[2] In the Interior; on the Coast, chips are measured in "gravity packed units" and the timber tax is set at $1.11 per G.P.U.

for cottonwood; and $1.00 for all other species except cypress which, bringing exceptionally high prices in Japan, was subject to $40.00 per cunit.

TRENDS IN CONTROLLED EXPORTS

The volume of logs exported from the province fluctuates widely from year-to-year. Partly because of the criterion of domestic need applied by the advisory committee, these shipments tend to be lower in years when forest products markets are strong, and *vice versa.* In addition, the total volume of timber harvested responds to market conditions, so that the percentage of production exported (indicated in Table E-1) tends to move inversely to the peaks and troughs in forest products markets. Thus exports represented 2.6 per cent of the logs scaled in the depressed year of 1970, and only 0.2 per cent in the buoyant year of 1973.

Exports of chips and minor restricted products show a roughly similar but less clear relationship. Again the total volumes are small; although precise data are not available, it appears that the volume of chips exported has never been as much as 7 per cent of provincial production and while the percentage for minor products is undoubtedly higher, their value is in the same order as that of chip exports.

Provincial revenues from the timber tax have also varied widely over the last decade reflecting not only the fluctuations in volumes of exports but also the large changes in the tax. The conspicuous increase in 1974 was due in large part to levies on cypress logs sold in Japan.

Table E-1

EXPORTS OF RESTRICTED PRODUCTS, 1966 TO 1975

	logs			pulp chips	minor products[3]	
year	volume exported	*fraction of total harvest*[1]	*portion of exports subject to provincial restrictions*	volume exported	value of exports	total timber tax revenue
	thousands of cunits	*per cent*		thousands of bone dry units[2]	millions of dollars	thousands of dollars
1966	236.7	*1.5*	*69.0*	28.2	10.3	81.6
1967	339.0	*2.2*	*66.3*	372.9	10.7	112.4
1968	309.1	*1.8*	*47.4*	297.3	9.4	73.2
1969	259.4	*1.4*	*58.9*	184.0	7.4	76.4
1970	500.0	*2.6*	*73.1*	153.2	10.6	183.0
1971	281.1	*1.4*	*83.5*	354.3	8.0	117.4
1972	101.9	*.5*	*70.5*	353.1	5.1	34.0
1973	47.5	*.2*	*31.2*	306.8	6.1	13.8
1974	210.0	*1.0*	*46.1*	247.1	14.6	3,313.8
1975	150.1	*.8*	*51.1*	271.9	9.5	549.9

[1] Volume exported as percentage of total volume scaled.

[2] Forest Service records express coastal exports in terms of Gravity Packed Units (G.P.U.'s). Here coastal exports have been converted to Bone Dry Units (B.D.U.'s) according to the formula: 1 G.P.U.=.74 B.D.U.

[3] Approximate f.o.b. value in Canadian dollars of minor restricted products; mainly poles, piling, shakes, and Christmas trees.

Source: Compiled from data provided by the B.C. Forest Service.

APPENDIX F

A NOTE ON THE PUBLIC HEARINGS

The Public Inquiries Act, under which this inquiry has been conducted, permits Commissions to decide whether they shall conduct public hearings to aid them in their investigations. Shortly after my appointment in June 1975, I concluded that, in view of the complexity and diversity of the policy issues raised by my terms of reference, this inquiry was likely to attract the attention of a wide range of industrial, professional, governmental, and lay interests throughout the province. An inquiry into forest policy had not been convened for almost twenty years. This, together with the dramatic industrial developments and burgeoning environmental interest in forest development that the intervening years have witnessed, convinced me that I should use the medium of public hearings to receive information and advice from interested groups and individuals throughout the province.

Following an initial session convened in Vancouver on June 27, 1975, for the purpose of proposing procedural rules, public hearings began on August 12th in Prince George and during the following months hearings were held in Nelson, Prince Rupert, Kamloops, Victoria, and Vancouver, where they concluded in December. During this period the Commission sat for 55 days, received almost 200 written briefs, and logged nearly 10,000 pages of transcribed testimony. In terms of the wide diversity of interests represented and the information and advice they generated, the hearings were highly successful, and the record of this inquiry would not be complete without a brief comment about them.

TERMS OF REFERENCE

When a Commission of this kind is appointed by the Lieutenant-Governor in Council it is normally given terms of reference that formally delineate the subject matter of the investigation, focusing the Commission's attention on the specific aspects of public affairs on which the government seeks advice. The first part of my terms of reference (reproduced in the Preface) defines the scope of the inquiry in this fashion; but I was given additional direction in the form of broad policy objectives to be pursued in designing my recommendations. To my knowledge no Commission of Inquiry appointed in the past has been given such guidance.

This innovation has proven to be very helpful to me in discharging my responsibilities and in focusing discussion in the public hearings. By setting out, even in general terms, the public goals to be served by the policies I was instructed to review, the government constructively served the necessarily political function of broadly defining the public interest. I was thereby relieved of responsibility for making fundamental value judgments or assumptions about political objectives, and was able to address myself more objectively to designing policy reforms that will serve the prescribed goals. This refinement to terms of reference might well be continued in appointments of Commissions in the future.

HEARING LOCATIONS

The six cities where public hearings were held were chosen for their location as centres for the various regions of the province: the northern Interior; the Kootenays; the south-central Interior; the northwest; Vancouver Island; and the Lower Mainland. Although participants were free to choose the locality for their presentation, or to submit two or more briefs at different sessions, their briefs were usually presented in the city closest to their residence or place of business. The submissions and discussion at each of the sessions thus tended to focus on issues of the region, which in the aggregate provided a thorough review of problems throughout the province.

The hearings were supplemented by field trips for the Commission staff, to observe at first hand the characteristic forest conditions and management problems in each region. Most of these informal tours were organized by the regional sections of the Canadian Institute of Forestry; they ensured that the parties included representatives of different public and private interest groups, so that the Commission staff would be exposed to the full range of commentary.

PROCEDURES

The Public Inquiries Act leaves the procedures for public hearings to the Commission's discretion. In structuring them for this inquiry I sought to provide a forum that was easily accessible, and as conducive as possible to informal discussion of problems as the required dignity of the proceedings permitted. Thus rules were set out in some detail, but formal procedural trappings were minimized. Many of the procedures used in courts of law, which are often adopted for public hearings as well, appear unsuitable for this purpose. The primary function of public hearings of this kind, in my judgment, is not to establish facts (for there are usually other ways of verifying factual information) or to deal with specific allegations, but rather to gather general information about problems and, particularly, to obtain the observations and advice of knowledgeable and interested people. Thus some of the formal rules of evidence and cross-examination were not invoked. Moreover, participants were encouraged to make presentations and answer questions directly, rather than through legal counsel, in order to obtain maximum benefit of their expertise and guidance. Legal counsel was seldom used. I also found it expedient for me and my advisors to examine witnesses directly for the most part, rather than through the Commission's legal counsel.

Invitations to participate in the hearings were placed in daily newspapers throughout the province, requesting notification by July 15, 1975. By that date well over 100 notices had been received. Dozens of notices were filed past that deadline, but nearly all were accommodated.

Submissions took the form of written briefs, five copies of which were required to be delivered to the Commission five working days prior to commencement of the hearings in the city where they were to be presented. This gave me and my staff time to review each brief thoroughly before it was presented. Then, at the outset of the sessions in each centre, a further fifty copies were made available for distribution to other interested participants. The Commission reproduced these additional copies for participants who found it a financial hardship to meet this requirement. The fifty copies often proved inadequate to meet the demands of other participants, the press, and the public at large. The Commission therefore had copies of all briefs lodged in the public library in each of the cities where hearings were held. Several participants whose submissions attracted keen interest made extra copies available.

The hearings were conducted according to a relatively tight timetable. This, and the desirability of closely adhering to a schedule for the benefit of participants, called for procedures that would enable Commission staff to plan the sessions efficiently. Before the hearings convened in each centre, participants appearing there were notified of the date and approximate time for their presentations, to enable them to plan accordingly. This tentative advance scheduling proved very helpful, and only on a few occasions did the sessions fall behind the programme.

At the hearings themselves, participants (or their representatives in the case of companies, associations, or government agencies) were sworn as witnesses, and a copy of each brief was filed as an Exhibit. A list of these appears in Appendix G. Participants were not required to read their briefs into the record, my advisors and I having studied them beforehand and copies being available to others, but they were given thirty minutes for an introductory statement. Then witnesses answered questions arising from the briefs put to them first by myself and my staff, and then by other participants. Individuals who were not participating in the hearings were given an opportunity to put questions through Commission staff. Once all questioning was completed, witnesses were invited to make a final concluding comment.

A number of witnesses other than participants appeared at the request of the Commission. Officials of the Forest Service and the Fish and Wildlife Branch, an independent wildlife consultant, and a forest hydrologist appeared as Commission Witnesses to answer questions in their special fields. The proceedings of the hearings were recorded and transcribed by a private reporting service, and copies of the transcript could be purchased directly from that firm.

The public hearings concluded on December 18. To provide participants with an opportunity to clarify any points arising out of their appearance at the hearings, or to rebut statements made by others, they were invited to submit final written statements to the Commission by February 15, 1976. Of the 188 participants, 39 filed summary statements.

Participation at the Public Hearings

Being the group whose economic interests are most directly affected by public forest policy, the forest industry was well represented at the hearings through individual companies and associations of manufacturing companies, loggers, and contractors. As well, the Commission received representations from a large number of other individuals and groups whose professional and business interests are closely linked to the industry: forest and economic consultants, investment firms, professional forestry associations, individual foresters, and labour unions. The provincial and federal government agencies most directly concerned with forest resource management also were well represented.

Together these groups contributed substantially to the hearings, but the present breadth of interest in forest policy was reflected in the number and quality of presentations from individuals and groups having no such ties with the forest industry. More than one-third of the participants were in this category. Environmental, conservation, and outdoor recreation groups appeared in almost every region to express their concerns; the agriculture, mining, guiding, and trapping industries drew attention to special resource use conflicts; regional and municipal governments, water districts, and community associations articulated local problems; native Indian bands expressed their anxieties and aspirations; academic specialists in forestry, economics, entomology, hydrology, and ecology volunteered their special knowledge; members of the investment community analysed the industry's financial problems; a political party offered its perspective; and a host of individuals, appearing in their own right, appeared to express their concerns and to suggest changes in public policy.

This wide range of participation in the hearings contributed substantially to their success, and provided me with a broad spectrum of information and advice. But apart from their usefulness to me and my staff, the hearings provided a valuable forum for a constructive exchange of views among those with varying and often conflicting interests in the province's forest resources. This, in itself, is undoubtedly an important function that can incidentally be served by a Commission of this kind.

In Chapter 25 I discussed the rôle in public policy review that Commissions of Inquiry are best suited to play. For the purposes of my investigation this arrangement has proven highly suitable, particularly insofar as it enabled me to use the medium of public hearings to gather background material and advice for preparing this report.

APPENDIX G

TABLE G-1—ALPHABETICAL LIST OF PARTICIPANTS

Participant	Location	Date	Exhibit No.	Witnesses
Alexander, N. E. and Borden, Dr. J. H.	Vancouver	Dec. 10/75	188	N. E. Alexander Dr. J. H. Borden
Allen, Marty	Prince Rupert	Sept. 16/75	55	M. Allen
Alpine Club of Canada—Vancouver Island Section	Victoria	Oct. 23/75	111	J. Gibson G. Parker S. Watts
Ardew Wood Products Ltd.	Kamloops	Oct. 6/75	97	E. Norgaard L. Norgaard
Aspen Planers Ltd.	Kamloops	Oct. 1/75	82	R. Hack H. Hamilton T. Singh Ghog
Associated Logging Contractors	Vancouver	Nov. 12/75	128	P. Carson J. Livland R. J. McKercher E. Preus
Association of British Columbia Professional Foresters	Vancouver	Nov. 14/75	133	H. Bancroft G. Burch H. Lyon
Ayers, Maurice	Victoria	Oct. 31/75	124	M. Ayers
Balco Industries Ltd.	Kamloops	Sept. 25/75	62	D. L. Balison T. Jeanes J. Obana
Bay Forest Products Ltd.	Vancouver	Nov. 26/75	164	G. Patterson E. Sonner
Belize Forest Products Ltd.	Vancouver	Nov. 20/75	147	R. H. Bicknell D. J. Dumaresq
Belkin Packaging Ltd.	Vancouver	Dec. 1/75	176	M. Belkin B. Palmer
Bell Pole Co. Ltd.	Kamloops	Sept. 29/75	75	C. Hopkins G. Richardson G. Ritchie
British Columbia Cattlemen's Association	Kamloops	Sept. 25/75	63	L. Bawtree H. Blazowski
British Columbia Forest Products Limited	Vancouver	Nov. 18/75	141	I. A. Barclay G. Burch D. A. Saunders
British Columbia Forest Service*	Prince George	Aug. 15/75	—	A. DeGraff W. D. Grainger J. S. Stokes
British Columbia Forest Service	Nelson	Sept. 4/75	38	J. Bullen J. Cuthbert K. Sumanik† W. Young
British Columbia Forest Service*	Victoria	Oct. 29/75	—	E. Knight D. Owen R. Robins J. S. Stokes W. Young
British Columbia Forest Service*	Vancouver	Nov. 21/75	—	D. Glew E. Knight D. Owen R. Robins J. S. Stokes

* Commission witness: no written submission.

† Appeared with the Forest Service, but was employed by the Fish and Wildlife Branch.

Participant	Location	Date	Exhibit No.	Witnesses
British Columbia Forest Service*	Vancouver	Dec. 17–18/75	....	D. Cuthbert D. Glew C. Johnson E. Knight D. Owen J. S. Stokes T. Young
British Columbia Independent Logging Association	Victoria	Oct. 23/75	113	C. Fraser G. Sawczuk J. Schellenberg B. Schneider A. Strimbold
British Columbia Snow Vehicle Association	Kamloops	Sept. 30/75	78	T. Chermsnok B. Shields
B.C. Wildlife Federation	Vancouver	Nov. 17/75	139	A. Downs B. Otway E. Mankelow
Canadian Cellulose Company, Limited	Vancouver	Dec. 16/75	204	A. V. Backman D. Best R. Gross F. Waldie
Canadian Cellulose Company, Limited—Interior Operations	Nelson	Sept. 4/75	36	A. V. Backman D. Best O. Burchardt E. Higgs C. Johnson G. McLaughlin C. Symons R. Thorp
Canadian Cellulose Company, Limited—Northern Operations	Prince Rupert	Sept. 12/75	50	A. V. Backman D. Best R. Duncan D. Gardiner G. McLaughlin F. Waldie
Canadian Forest Products Ltd. and affiliated companies	Vancouver	Nov. 13/75	130	A. G. Armstrong P. Bentley W. G. Gayle G. Hart J. R. Longstaffe D. E. Rickson
Canadian Institute of Forestry—Cariboo Section	Prince Rupert	Sept. 11/75	44	R. Baker F. Renshaw
Canadian Institute of Forestry—Kootenay Section	Nelson	Sept. 2/75	28	R. Anderson J. Cuthbert W. Morrison D. Oswald I. Scott
Canadian Institute of Forestry—Pacific Section	Victoria	Oct. 24/75	117	M. Broeren D. Kosick R. Lasser J. Leesing E. R. Mattice
Canadian Institute of Forestry—Vancouver Island Section	Victoria	Oct. 23/75	110	J. T. Arnott C. P. Brett J. Bullen W. Pearson
Canadian Institute of Forestry—Vancouver Section	Vancouver	Nov. 17/75	137	D. Haley C. Johnson J. Toovey
Canfor Limited—Chetwynd Division	Prince George	Aug. 19/75	25	G. Armstrong P. Bentley B. MacAuley G. A. Patterson H. Smith
Canoe Sport British Columbia	Vancouver	Dec. 2/75	180	B. Creer
Canyon Creek Forest Products Ltd.	Prince George	Aug. 18/75	22	G. Beaven D. Ruhl D. Schine
Cariboo Lumber Manufacturers' Association	Kamloops	Sept. 29/75	72	T. Jeanes J. Marritt C. Pinette

* Commission witness: no written submission.

Participant	Location	Date	Exhibit No.	Witnesses
Central Interior Loggers' Association	Kamloops	Oct. 1/75	84	D. Callaghan J. Dyck G. Kirschke H. Lloyd A. Strimbold
Chaworth-Musters, P.	Vancouver	Dec. 10/75	186	P. Chaworth-Musters
Chernoff Bros. Sawmill Ltd.	Nelson	Sept. 3/75	34	W. W. Chernoff
Clear Lake Sawmills Ltd.	Prince George	Aug. 14/75	19	G. Deere W. Pattenton H. Roine
Coastal Reforestation Board	Victoria	Oct. 31/75	122	B. Devitt B. Jones
Cobb, Dorothy and Jim	Vancouver	Dec. 12/75	195	D. Cobb J. Cobb
Collins, J. R.	Victoria	Oct. 20/75	100	J. R. Collins
Columbia Valley Guides and Outfitters	Nelson	Sept. 5/75	42	A. Cooper
Communist Party of Canada—B.C. Provincial Committee	Vancouver	Dec. 15/75	197	N. Morgan
Comox District Mountaineering Club	Victoria	Oct. 21/75	102	R. Masters
Comox-Strathcona, Regional District of	Victoria	Oct. 31/75	123	A. Byers R. Ellis H. McQuillan
Council of Forest Industries of British Columbia	Vancouver	Dec. 12/75	196	J. P. Angus G. Draeseke M. Painter
Council of Forest Industries of British Columbia—Northern Interior Lumber Sector	Prince Rupert	Sept. 15/75	51	D. Frood D. Mankelow E. G. Marples E. V. Scoffield R. H. Stowell J. F. Whitmer
Crawford, M. J.	Vancouver	Nov. 20/75	149	M. J. Crawford
Crestbrook Forest Industries Ltd.	Nelson	Sept. 5/75	40	D. Loyd J. Murray R. Ruault
Crooked River Forest Association	Prince George	Aug. 13/75	13	M. England D. Frood A. Nevison B. Stowell
Crown Zellerbach Canada Limited	Kamloops	Sept. 24/75	61	W. D. Beaton H. Carter D. Gray A. Jarrett G. Nagle T. Neighbour R. G. Rogers
Crown Zellerbach Canada Limited	Vancouver	Nov. 25/75	161	W. D. Beaton M. Philip A. Rafter R. G. Rogers
Crows Nest Industries Limited	Nelson	Sept. 2/75	30	N. Denmark S. Ocsko G. Twamley
Decker Lake Forest Products Ltd.	Prince Rupert	Sept. 16/75	53	L. Hope
Devitt, B.	Victoria	Oct. 22/75	107	B. Devitt
Doman Industries Limited	Victoria	Oct. 21/75	104	J. R. Abercrombie J. R. Frumento T. Thomson
Dominion Securities Corporation Harris & Partners Limited	Vancouver	Nov. 27/75	166	P. Brown D. Cunningham
Drew Sawmills Ltd.	Kamloops	Sept. 26/75	67	E. Drew R. Robertson
East Creston Irrigation District	Nelson	Sept. 3/75	33	E. Masuch J. Shukin
Eichel, Gerhard H.	Kamloops	Oct. 3/75	89	G. H. Eichel
Elk River Timber Company Limited	Victoria	Oct. 30/75	118	T. R. Sheldon
Environment, Canada Department of—Fisheries and Marine Service, Fisheries Operations Directorate	Vancouver	Dec. 9/75	185	F. Boyd M. Brownlee D. Toews
Environment and Land Use Committee Secretariat	Vancouver	Dec. 9/75	183	A. Crerar D. O'Gorman R. Travers

Participant	Location	Date	Exhibit No.	Witnesses
Ernst, Bruce and Paulette	Prince George	Aug. 12/75	9	B. Ernst P. Ernst
Ernst Forest Products Ltd.	Prince George	Aug. 12/75	8	J. Ernst A. Scholefield
Eurocan Pulp & Paper Co. Ltd.	Prince Rupert	Sept. 11/75	46	E. Olander B. W. Wasson
Eurocan Pulp & Paper Co. Ltd.	Prince Rupert	Sept. 15/75	----	A. G. Duholke D. W. Goddard E. G. Riikallio M. O. Skogster B. W. Wasson
Evans Products Company Ltd. & Affiliates	Vancouver	Nov. 25/75	160	D. R. Kraft V. E. Nightscales J. R. Richardson
Farquharson, Ken	Vancouver	Nov. 12/75	126	K. Farquharson
Federated Co-Operatives Limited	Kamloops	Sept. 26/75	70	G. Hall M. Persson A. Sadler
Federation of British Columbia Naturalists	Vancouver	Nov. 24/75	158	N. Purssell D. Stace-Smith
Federation of Mountain Clubs of British Columbia	Vancouver	Nov. 20/75	145	R. Freeman D. Thompson
Forestal International Limited	Vancouver	Dec. 1/75	177	D. Laishley
Frolek Sawmills Ltd.	Vancouver	Dec. 15/75	198	D. Frolek N. McLean
Galloway Lumber Company	Kamloops	Sept. 29/75	74	C. Nelson H. Nelson
Gardner, Dr. J. A. F.	Vancouver	Nov. 20/75	146	J. A. F. Gardner
Goodwin Johnson Ltd.	Vancouver	Nov. 25/75	159	C. Germyn G. Johnson B. Knifton
Gorman Bros. Lumber & Box Ltd.	Vancouver	Nov. 17/75	138	B. Christie J. Gorman R. Gorman
Gregory Industries Limited	Vancouver	Nov. 28/75	170	P. J. Gregory
Hanna, T. R. and Northwest Log Salvors Association	Vancouver	Nov. 14/75	134	G. Carson T. R. Hanna G. MacDougall
Hatch, R. P.	Nelson	Sept. 3/75	35-A	I. K. Barber R. P. Hatch I. Mahood
Helco Forest Products Ltd.	Prince George	Aug. 15/75	20	D. Wilson
Hughes, R.	Kamloops	Oct. 3/75	93	R. Hughes
Independent Squamish Logging Operators Limited	Vancouver	Dec. 11/75	192	N. Bar P. Brennan
Integrated Wood Products Ltd.	Kamloops	Sept. 25/75	65	G. Boulton A. M. Gilmour K. Long P. Smith
Interior Logging Association	Kamloops	Sept. 25/75	64	C. Desrosiers H. Hildred R. Lind
Interior Lumber Manufacturers' Association	Nelson	Sept. 2/75	29	N. Denmark E. Drew A. Macdonald R. Wood
Interior Lumber Manufacturers' Association	Kamloops	Sept. 26/75	68	E. Drew I. Dunlop A. Macdonald F. Stinson
Interior Resource Users Association	Kamloops	Sept. 29/75	76	F. Higgs D. Mustard
International Woodworkers of America—Regional Council No. 1	Vancouver	Dec. 12/75	193	L. Harding B. Hawks J. Munro W. Trineer
Islands Trust	Victoria	Oct. 24/75	114	D. Brousson M. Holmes
Kispiox Valley Community Association	Vancouver	Dec. 10/75	39	M. Clay J. Easterday
Kitimat-Stikine Regional District	Prince Rupert	Sept. 16/75	54	A. Nicols J. Pousette

Participant	Location	Date	Exhibit No.	Witnesses
Krajina, Dr. V. J.	Vancouver	Nov. 24/75	155	Dr. V. J. Krajina
Lakeland Mills (1973) Ltd.	Prince George	Aug. 14/75	16	I. Andersen T. Dilworth G. Killy D. Parker G. Redding
Lavington Planer Mill Ltd.	Kamloops	Oct. 2/75	85	R. Reid J. A. Thorlakson
Lepetich, Mark G.	Prince George	Aug. 19/75	26	M. Lepetich
Lignum Limited	Kamloops	Sept. 29/75	73	J. Kerr T. Kerr J. Marritt
Little, Haugland & Kerr Ltd.	Prince Rupert	Sept. 16/75	57	W. Lindstrom G. Rowland
L & K Lumber (North Shore) Limited	Vancouver	Nov. 13/75	132	R. Fisher R. Johnson D. Shaw
Lord, Steve	Vancouver	Dec. 12/75	194	S. Lord
L'Orsa, J. A. and Kruisselbrink, H.	Prince Rupert	Sept. 15/75	52	J. L'Orsa
McBride Plywood Limited	Kamloops	Oct. 6/75	94	J. Kennedy D. Parker A. McAloney D. Monroe
MacMillan Bloedel Limited	Prince Rupert	Sept. 12/75	48	G. Ainscough
MacMillan Bloedel Limited	Vancouver	Dec. 8/75	182	G. Ainscough K. Boyd F. H. Britton J. R. Forrest D. W. Timmis
McMullan, D. E.	Victoria	Oct. 24/75	116	D. E. McMullan
Mabel Lake Shingle Ltd.	Kamloops	Oct. 1/75	81	B. Clark H. Hamilton
Marshall, F.	Kamloops	Sept. 30/75	80	F. Marshall
Midway, Corporation of the Village of	Kamloops	Oct. 3/75	91	G. H. Eichel
Mill and Timber Products Ltd.	Vancouver	Nov. 27/75	168	B. Gillis J. Gillis E. Neale
Milner, L. J. Associates Ltd. and Inland Timber Management Ltd.	Kamloops	Sept. 30/75	79	G. Boulton R. Fowler L. J. Milner
Mining Association of British Columbia	Vancouver	Dec. 1/75	175	M. Hoole B. Matthew R. Sproule
Mount Waddington, Regional District of	Vancouver	Dec. 9/75	184	B. Dumont G. Furney
Munro, D. D. and Walters, J.	Vancouver	Nov. 14/75	136	D. D. Munro J. Walters
Murray, Cameron	Kamloops	Sept. 24/75	60	C. Murray
Nass Valley Communities Association	Prince Rupert	Sept. 16/75	58	R. Barber W. C. Samland
Nechako Forest Association	Prince George	Aug. 12/75	10	R. Clinton J. Deere G. Marples D. Wilson
Nehaliston Lumber Co. Ltd.	Vancouver	Dec. 10/75	189	K. Poucher
Netherlands Overseas Mills Ltd.	Vancouver	Nov. 27/75	167	M. England P. Hall J. Whitmer
Nicola Valley Indian Administration	Kamloops	Oct. 2/75	86	G. Antoine D. Moses
Nichols, J. S.	Vancouver	Dec. 2/75	178	J. S. Nichols
North Central Plywoods Ltd.	Prince George	Aug. 14/75	18	D. Flynn
North West Loggers Association	Prince Rupert	Sept. 11/75	43	A. Houlden J. Jackson J. Sarich C. Shelford
Northern Affairs, British Columbia Ministry for	Prince George	Aug. 14/75	17	S. Simons
Northwood Properties Ltd.	Victoria	Oct. 30/75	120	D. Davenport R. P. Dewar C. M. Frantz F. T. Stinson

Participant	Location	Date	Exhibit No.	Witnesses
Northwood Pulp and Timber Limited	Prince George	Aug. 19/75	27	D. Davenport H. Hanreider L. Johnson D. Little H. Sander G. Thompson A. Zimmerman
Okanagan Similkameen Parks Society	Kamloops	Oct. 3/75	90	D. Fraser J. Woodworth
Outdoor Recreation Council of British Columbia	Vancouver	Nov. 26/75	162	A. Carter J. Hazel B. Shields
Pacific Coast Log Exporters Association	Vancouver	Nov. 19/75	143	B. Knifton D. McKinnon E. D. Riordan
Pacific Logging Company Limited	Vancouver	Dec. 15/75	199	M. Ayers B. Devitt R. D. McBride W. M. Sloan
Pallan Timber Products, Ltd.	Vancouver	Nov. 12/75	125	T. Pallan
Palliser Wilderness Society	Kamloops	Oct. 6/75	95	A. W. Askey
Pelton Reforestation Ltd.	Vancouver	Nov. 24/75	154	N. Pelton
Pemberton Securities Limited	Vancouver	Dec. 11/75	191	M. Leith K. Shields
Percy, G. E.	Vancouver	Nov. 12/75	129	G. E. Percy
Pope & Talbot Ltd.	Nelson	Sept. 3/75	32	D. Uphill
Price-Skeena Forest Products Ltd.	Prince Rupert	Sept. 16/75	56	W. H. McRae
Prince George, City of	Kamloops	Sept. 26/75	69	G. Kondor H. Lloyd H. Moffat
Prince George Pulp and Paper Limited and Intercontinental Pulp Company Ltd.	Prince George	Aug. 18/75	23-A	A. G. Armstrong L. L. G. Bentley J. D. Falck M. H. Gunther W. E. Haviland R. S. Jewesson
Prince Rupert, City of	Prince Rupert	Sept. 12/75	49	G. Howie P. Lester
Prince Rupert Forest Products Limited	Prince Rupert	Sept. 11/75	47	D. Manning N. Manning D. Miles T. Stevens
Q. C. Timber Ltd.	Vancouver	Nov. 28/75	171	R. G. Annable T. Matsuki
Quesnel Cattlemen's Association	Prince George	Aug. 13/75	15	J. Fouty
Rainsford, F. G.	Victoria	Oct. 22/75	108	F. G. Rainsford
Rayonier Canada Limited	Vancouver	Dec. 2/75	181	A. B. Anderson R. Douglas H. Urquhart R. Vivian
Recreation and Conservation, Department of—Fish and Wildlife Branch*	Prince George	Aug. 15/75	....	K. Child G. Chislett D. King
Recreation and Conservation, Department of—Fish and Wildlife Branch, Kootenay Region	Nelson	Sept. 5/75	41	H. Andrusak R. Demarchi K. Sumanik
Recreation and Conservation, Department of—Fish and Wildlife Branch	Vancouver	Nov. 28/75	173	H. Andrusak A. Eadie J. Hatter D. Herbert D. King D. J. Robinson K. Sumanik E. Vernon
Recreation and Conservation, Department of—Parks Branch	Vancouver	Nov. 28/75	173	R. Ahrens T. Lee E. Vernon
Reed, F. L. C. and Associates Ltd.	Vancouver	Dec. 11/75	190	R. Burns L. Reed
Revelstoke Sawmill (Radium) Ltd.	Kamloops	Sept. 30/75	77	F. Fortin B. Swan
Richmond Plywood Corporation Ltd.	Vancouver	Dec. 17/75	205	D. Valpy T. Wood

* Commission witness: no written submission.

Participant	Location	Date	Exhibit No.	Witnesses
Riley, M., *et. al.*	Kamloops	Sept. 25/75	66	D. Gray A. Riley E. Riley F. Riley M. Riley
Riverside Forest Products Ltd.	Kamloops	Sept. 24/75	59	R. Pringle G. Raboch G. Steel
Sauder Industries Limited	Vancouver	Nov. 27/75	169	Mr. Hildebrande Mr. Sitter W. L. Sauder
Schiedel, I. H.	Vancouver	Dec. 2/75	179	I. Rockwell I. H. Schiedel
Schon Timber Limited	Victoria	Oct. 21/75	103	D. Schon
Scott, A. D. and Shearer, R. A.	Vancouver	Dec. 1/75	174	A. D. Scott R. A. Shearer
Scott Paper Limited	Vancouver	Nov. 18/75	140	G. Blom D. Holme
Seabrook, K. G.	Prince George	Aug. 13/75	14	K. G. Seabrook
Shuswap-Thompson River Research and Development Association	Kamloops	Oct. 3/75	92	J. R. Boulding
Sierra Club—Western Canada Chapter—Victoria Group	Victoria	Oct. 23/75	112	E. Howden B. Pinch
Sierra Club of B.C.—Vancouver Group	Vancouver	Nov. 24/75	157	J. Fagerlund
Skidegate Band Council	Prince Rupert	Sept. 11/75	45	P. Gladstone C. Linde
Small Independent Operators—Lumby-Cherryville Area	Kamloops	Sept. 26/75	71	E. Foisy E. Hickling M. Stetsko
Smith, George J.	Vancouver	Nov. 13/75	131	G. J. Smith
Smith, Glen*	Vancouver	Dec. 9/75	—	G. Smith
Smith, J. H. G.	Vancouver	Nov. 26/75	163	J. H. G. Smith
Sooke Forest Products Ltd.	Victoria	Oct. 20/75	101	H. Smith
SPEC—Smithers	Vancouver	Dec. 15/75	200	R. Overstall T. Pearse
Steelhead Society of British Columbia	Vancouver	Nov. 19/75	144	H. Clifford B. Thornton C. Woods
T & H Sawmills Ltd. and Thomas & Howlett Holdings Ltd.	Kamloops	Oct. 2/75	87	J. R. Howlett
Tahsis Company Ltd.	Vancouver	Nov. 14/75	135	J. V. Christensen M. J. Hallett S. I. O. Rasmussen
Takla Association	Prince George	Aug. 13/75	11	M. England H. Gairns F. Hutchinson G. Marples T. Moffat
Takla Forest Products Limited	Prince George	Aug. 18/75	24	A. G. Armstrong L. L. G. Bentley J. R. Bickell J. D. Falck M. H. Gunther W. E. Haviland R. S. Jewesson
Trail Wildlife Association and West Kootenay Outdoorsmen	Nelson	Sept. 4/75	37	G. F. Kenyon
Triangle Pacific Forest Products Ltd.—Slocan Division	Nelson	Sept. 3/75	35	I. K. Barber R. P. Hatch I. Mahood
Tri Pac Studs Ltd.	Prince George	Aug. 12/75	7	I. K. Barber G. Long I. Mahood
Truck Loggers Association	Vancouver	Nov. 19/75	142	D. MacKenzie I. S. Mahood D. O'Connor
United Fishermen and Allied Workers' Union	Vancouver	Dec. 16/75	203	E. Neish
Valley Resource Society	Nelson	Sept. 4/75	39	R. Bockner C. Evans M. Hudson G. McLeod-Bockner A. F. Strebchuk M. L. Thomson

* Commission witness: no written submission.

Participant	Location	Date	Exhibit No.	Witnesses
Victims of Industry Changing Environment (V.O.I.C.E.)	Vancouver	Dec. 16/75	202	W. Horswell T. Pearse L. Watmough
Warren, W. H.	Victoria	Oct. 22/75	105	W. H. Warren
Weier's Sawmill Ltd.	Kamloops	Oct. 1/75	83	H. Hamilton D. Hopkins
Weldwood of Canada Limited	Victoria	Oct. 22/75	106	T. A. Buell P. Desjardins D. Sainsbury A. Szalkai
Weldwood of Canada Limited	Vancouver	Dec. 16/75	201	T. Buell Mr. Gray Mr. Rathburn D. Sainsbury
Wells, W. H.	Kamloops	Oct. 6/75	96	R. Brenton B. Crakes B. Graham W. H. Wells
West Coast District Council of Indian Chiefs	Victoria	Oct. 30/75	121	J. Jack S. Lucas E. Smith W. H. Stromquist
West Coast Environmental Law Association	Vancouver	Nov. 24/75	156	J. Mackenzie
West Fraser Timber Co. Ltd.	Kamloops	Oct. 6/75	98	P. B. Bodman D. Johnston S. K. Ketcham
Western Guides and Outfitters Association and British Columbia Registered Trappers Association	Victoria	Oct. 24/75	115	J. Lowry
Western Independent Log Haulers Association	Victoria	Oct. 20/75	99	J. T. Fisher
Weyerhaeuser Canada, Ltd.	Kamloops	Oct. 2/75	88	T. Hilliard D. McInnes D. Munro S. Tolnai
Weyerhaeuser Canada, Ltd.	Vancouver	Nov. 26/75	165	T. Hilliard D. McInnes S. Tolnai
Whonnock Industries Limited	Victoria	Oct. 30/75	119	D. Fraser H. Henry C. Johnson N. Mason
Willington, Dr. R. P.*	Vancouver	Dec. 17/75	—	Dr. R. P. Willington
Willow-Ahbau Forest Association	Prince George	Aug. 13/75	12	K. Baker P. Bodman M. England H. Gairns J. Potter J. Rustad
Wray, Capt. E. A.	Vancouver	Nov. 20/75	148	E. A. Wray
Wylie, Neil	Prince George	Aug. 15/75	21	N. Wylie
Wynndel Irrigation District	Nelson	Sept. 2/75	31	D. Anderson S. Enderton
Zak, J. B.	Victoria	Oct. 22/75	109	B. Zak

* Commission witness: no written submission.

TABLE G-2—LIST OF EXHIBITS

No.	Description	Location	Date
1	Order in Council No. 2044*	Vancouver	June 27/75
2	Oath Sworn by Commissioner*	Vancouver	June 27/75
3	B.C. Gazette, June 19/75*	Vancouver	June 27/75
4a	Copy of Notice Published in Newspapers*	Vancouver	June 27/75
4b	List of Newspapers, with dates of Publication and Counties*	Prince George	Aug. 12/75
5	Proposed Procedures*	Prince George	June 27/75
6	Final Form of Procedures*	Prince George	Aug. 12/75
7	Tri Pac Studs Ltd.	Prince George	Aug. 12/75
8	Ernst Forest Products Ltd.	Prince George	Aug. 12/75
9	Paulette and Bruce Ernst	Prince George	Aug. 12/75
10	Nechako Forest Association	Prince George	Aug. 12/75
11	Takla Association	Prince George	Aug. 13/75
12	Willow-Ahbau Forest Association	Prince George	Aug. 13/75
12a	Copy of letter, dated July 31, 1975 from J. S. Stokes, Deputy Minister, B.C. Forest Service to Industrial Forestry Service Ltd.*	Prince George	Aug. 13/75
13	Crooked River Forest Association	Prince George	Aug. 13/75
14	Kirby G. Seabrook	Prince George	Aug. 13/75
15	Quesnel Cattlemen's Association	Prince George	Aug. 13/75
16	Lakeland Mills (1973) Ltd.	Prince George	Aug. 14/75
17	British Columbia Ministry for Northern Affairs	Prince George	Aug. 14/75
18	North Central Plywoods Ltd.	Prince George	Aug. 14/75
19	Clear Lake Sawmills Ltd.	Prince George	Aug. 14/75
20	Helco Forest Products Ltd.	Prince George	Aug. 15/75
21	N. Wylie	Prince George	Aug. 15/75
22	Canyon Creek Forest Products	Prince George	Aug. 18/75
23a	Prince George Pulp and Paper Limited and Intercontinental Pulp Company Ltd.	Prince George	Aug. 18/75
23b	PHA Agreement No. 1, dated November 22, 1962 and Amendments No. 1, 2, 3 & 5.*	Prince George	Aug. 18/75
23c	PHA Agreement No. 7, dated January 24, 1966 and Amendment No. 1.*	Prince George	Aug. 18/75
23d	"Comments on Utilization of Hardwood and Sawdust" by Prince George Pulp and Paper Limited and Intercontinental Pulp Company Ltd."	Prince George	Aug. 18/75
23e	"The Current Position of the Interior Pulp Industry", submission to the Minister of Lands, Forests and Water Resources by the Interior Pulp Industry, dated June 6, 1975.*	Prince George	Aug. 18/75
24	Takla Forest Products Limited	Prince George	Aug. 18/75
25	Canfor Limited—Chetwynd Division	Prince George	Aug. 19/75
25a	Letters dated April 22, 1975 and May 29, 1975, from M. G. Isenor, District Forester, B.C. Forest Service, Prince George, to "All Established Licensees".*	Prince George	Aug. 19/75
26	Mark G. Lepetich	Prince George	Aug. 19/75
27	Northwood Pulp and Timber Limited	Prince George	Aug. 19/75
28	Canadian Institute of Forestry—Kootenay Section	Nelson	Sept. 2/75
29	Interior Lumber Manufacturers' Association	Nelson	Sept. 2/75
30	Crows Nest Industries Limited	Nelson	Sept. 2/75
31	Wynndel Irrigation District	Nelson	Sept. 2/75
32	Pope & Talbot Ltd.	Nelson	Sept. 3/75
33	East Creston Irrigation District	Nelson	Sept. 3/75
34	Chernoff Bros. Sawmill Ltd.	Nelson	Sept. 3/75
35	Triangle Pacific Forest Products Ltd.—Slocan Division	Nelson	Sept. 3/75
35a	R. P. Hatch	Nelson	Sept. 3/75
36	Canadian Cellulose Company, Limited—Interior Operations	Nelson	Sept. 4/75
37	Trail Wildlife Association and West Kootenay Outdoorsmen	Nelson	Sept. 4/75
38	British Columbia Forest Service	Nelson	Sept. 4/75
39	Valley Resource Society	Nelson	Sept. 4/75
40	Crestbrook Forest Industries Ltd.	Nelson	Sept. 5/75

* Supplementary material other than written submissions presented by participants.

No.	Description	Location	Date
41	Department of Recreation and Conservation—Fish and Wildlife Branch, Kootenay Region	Nelson	Sept. 5/75
42	Columbia Valley Guides and Outfitters	Nelson	Sept. 5/75
43	North West Loggers Association	Prince Rupert	Sept. 11/75
44	Canadian Institute of Forestry—Cariboo Section	Prince Rupert	Sept. 11/75
45	Skidegate Band Council	Prince Rupert	Sept. 11/75
46	Eurocan Pulp & Paper Co. Ltd.	Prince Rupert	Sept. 11/75
47	Prince Rupert Forest Products Limited	Prince Rupert	Sept. 11/75
48	MacMillan Bloedel Limited	Prince Rupert	Sept. 12/75
49	City of Prince Rupert	Prince Rupert	Sept. 12/75
50	Canadian Cellulose Company, Limited—Northern Operations	Prince Rupert	Sept. 12/75
51	Council of Forest Industries of British Columbia—Northern Interior Lumber Sector	Prince Rupert	Sept. 15/75
52	J. L'Orsa and H. Kruisselbrink	Prince Rupert	Sept. 15/75
53	Decker Lake Forest Products Ltd.	Prince Rupert	Sept. 16/75
54	Kitimat-Stikine Regional District	Prince Rupert	Sept. 16/75
55	Marty Allen	Prince Rupert	Sept. 16/75
56	Price-Skeena Forest Products Ltd.	Prince Rupert	Sept. 16/75
57	Little, Haugland & Kerr Ltd.	Prince Rupert	Sept. 16/75
57a	Copy of letter, dated July 29, 1975 from W. G. Bishop, District Forester, B.C. Forest Service, Prince Rupert, to Little, Haugland & Kerr Ltd., regarding cedar poles.*	Prince Rupert	Sept. 16/75
58	Nass Valley Communities Association	Prince Rupert	Sept. 16/75
59	Riverside Forest Products Ltd.	Kamloops	Sept. 24/75
60	Cameron Murray	Kamloops	Sept. 24/75
61	Crown Zellerbach Canada Limited	Kamloops	Sept. 24/75
62	Balco Industries Ltd.	Kamloops	Sept. 25/75
63	British Columbia Cattlemen's Association	Kamloops	Sept. 25/75
64	Interior Logging Association	Kamloops	Sept. 25/75
65	Integrated Wood Products Ltd.	Kamloops	Sept. 25/75
66	Michael Riley *et. al.*	Kamloops	Sept. 25/75
67	Drew Sawmills Ltd.	Kamloops	Sept. 26/75
68	Interior Lumber Manufacturers' Association	Kamloops	Sept. 26/75
69	City of Prince George	Kamloops	Sept. 26/75
70	Federated Co-operatives Limited	Kamloops	Sept. 26/75
71	Small Independent Operators, Lumby-Cherryville Area	Kamloops	Sept. 26/75
72	Cariboo Lumber Manufacturers' Association	Kamloops	Sept. 29/75
73	Lignum Limited	Kamloops	Sept. 29/75
74	Galloway Lumber Company	Kamloops	Sept. 29/75
75	Bell Pole Co. Ltd.	Kamloops	Sept. 29/75
76	Interior Resource Users Association	Kamloops	Sept. 29/75
77	Revelstoke Sawmill (Radium) Ltd.	Kamloops	Sept. 30/75
78	British Columbia Snow Vehicle Association	Kamloops	Sept. 30/75
79	L. J. Milner Associates Ltd. and Inland Timber Management Ltd.	Kamloops	Sept. 30/75
80	Fred Marshall, R. P. F.	Kamloops	Sept. 30/75
81	Mabel Lake Shingle Ltd.	Kamloops	Oct. 1/75
82	Aspen Planers Ltd.	Kamloops	Oct. 1/75
83	Weier's Sawmill Ltd.	Kamloops	Oct. 1/75
84	Central Interior Loggers' Association	Kamloops	Oct. 1/75
84a	Addendum to Central Interior Loggers' Association brief.*	Kamloops	Oct. 1/75
85	Lavington Planer Mill Ltd.	Kamloops	Oct. 2/75
86	Nicola Valley Indian Administration	Kamloops	Oct. 2/75
87	T & H Sawmills Ltd. and Thomas & Howlett Holdings Ltd.	Kamloops	Oct. 2/75
88	Weyerhaeuser Canada, Ltd.	Kamloops	Oct. 2/75
89	Gerhard H. Eichel, R. P. F.	Kamloops	Oct. 3/75
90	Okanagan Similkameen Parks Society	Kamloops	Oct. 3/75
91	Corporation of the Village of Midway	Kamloops	Oct. 3/75
92	Shuswap-Thompson River Research and Development Association	Kamloops	Oct. 3/75
93	R. Hughes	Kamloops	Oct. 3/75
94	McBride Plywood Limited	Kamloops	Oct. 6/75
95	Palliser Wilderness Society	Kamloops	Oct. 6/75
96	William H. Wells	Kamloops	Oct. 6/75
97	Ardew Wood Products Ltd.	Kamloops	Oct. 6/75
98	West Fraser Timber Co. Ltd.	Kamloops	Oct. 6/75
99	Western Independent Log Haulers Association	Victoria	Oct. 20/75
100	J. R. Collins, R. P. F.	Victoria	Oct. 20/75
101	Sooke Forest Products Ltd.	Victoria	Oct. 20/75
102	Comox District Mountaineering Club	Victoria	Oct. 21/75
103	Schon Timber Limited	Victoria	Oct. 21/75
104	Doman Industries Limited	Victoria	Oct. 21/75
105	W. H. Warren	Victoria	Oct. 22/75
106	Weldwood of Canada Limited	Victoria	Oct. 22/75
107	B. Devitt	Victoria	Oct. 22/75
108	Frank G. Rainsford	Victoria	Oct. 22/75
109	J. Brian Zak, R. P. F.	Victoria	Oct. 22/75

* Supplementary material other than written submissions presented by participants.

No.	Description	Location	Date
110	Canadian Institute of Forestry—Vancouver Island Section	Victoria	Oct. 23/75
111	Alpine Club of Canada—Vancouver Island Section	Victoria	Oct. 23/75
112	Sierra Club—Western Canada Chapter, Victoria Group	Victoria	Oct. 23/75
113	British Columbia Independent Logging Association	Victoria	Oct. 23/75
114	Islands Trust	Victoria	Oct. 24/75
115	Western Guides and Outfitters Association and British Columbia Registered Trappers Association	Victoria	Oct. 24/75
116	D. E. McMullan, R. P. F.	Victoria	Oct. 24/75
117	Canadian Institute of Forestry—Pacific Section	Victoria	Oct. 24/75
118	Elk River Timber Company Limited	Victoria	Oct. 30/75
119	Whonnock Industries Limited	Victoria	Oct. 30/75
120	Northwood Properties Ltd.	Victoria	Oct. 30/75
121	West Coast District Council of Indian Chiefs	Victoria	Oct. 30/75
122	Coastal Reforestation Board	Victoria	Oct. 31/75
123	Regional District of Comox-Strathcona	Victoria	Oct. 31/75
124	Maurice Ayers	Victoria	Oct. 31/75
125	Pallan Timber Products, Ltd.	Vancouver	Nov. 12/75
126	Ken Farquharson	Vancouver	Nov. 12/75
127	Table prepared by B.C. Forest Service entitled "Tree Farm Licence Statistics—Vancouver Forest District".*	Vancouver	Nov. 12/75
127a	Table prepared by B.C. Forest Service entitled "Tree Farm Licence Statistics—Interior Tree Farm Licences".*	Vancouver	Nov. 26/75
128	Associated Logging Contractors	Vancouver	Nov. 12/75
129	G. E. Percy	Vancouver	Nov. 12/75
130	Canadian Forest Products Ltd. and affiliated companies	Vancouver	Nov. 13/75
131	George J. Smith	Vancouver	Nov. 13/75
132	L & K Lumber (North Shore) Limited	Vancouver	Nov. 13/75
133	Association of British Columbia Professional Foresters	Vancouver	Nov. 14/75
134	T. R. Hanna and Northwest Log Salvors Association	Vancouver	Nov. 14/75
135	Tahsis Company Ltd.	Vancouver	Nov. 14/75
136	D. D. Munro, R. P. F. and J. Walters, R. P. F.	Vancouver	Nov. 14/75
137	Canadian Institute of Forestry—Vancouver Section	Vancouver	Nov. 17/75
138	Gorman Bros. Lumber & Box Ltd.	Vancouver	Nov. 17/75
139	B.C. Wildlife Federation	Vancouver	Nov. 17/75
140	Scott Paper Limited	Vancouver	Nov. 18/75
141	British Columbia Forest Products Limited	Vancouver	Nov. 18/75
142	The Truck Loggers Association	Vancouver	Nov. 19/75
142a	Appendix 2 to the Brief of The Truck Loggers Association.*	Vancouver	Nov. 19/75
142b	Appendix 3 to the Brief of The Truck Loggers Association.*	Vancouver	Nov. 19/75
143	Pacific Coast Log Exporters Association	Vancouver	Nov. 19/75
144	The Steelhead Society of British Columbia	Vancouver	Nov. 19/75
145	Federation of Mountain Clubs of British Columbia	Vancouver	Nov. 20/75
146	Dr. Joseph A. F. Gardner	Vancouver	Nov. 20/75
147	Belize Forest Products Ltd.	Vancouver	Nov. 20/75
148	Capt. E. A. Wray	Vancouver	Nov. 20/75
149	Mike J. Crawford	Vancouver	Nov. 20/75
150	Document entitled "Bill 41, 1958, An Act to Amend the Forest Act—Explanatory Notes".*	Vancouver	Nov. 21/75
151	Memorandum, dated December 20, 1974, signed by E. L. Young, Chief Forester, B.C. Forest Service, to District Forester, B.C. Forest Service, Vancouver.*	Vancouver	Nov. 21/75
152	Letter, dated June 19, 1975, from W. Leesing, MacMillan Bloedel Limited, to Mr. F. Pendl, B.C. Forest Service, Vancouver, with attachment.*	Vancouver	Nov. 21/75
153	Letter dated November 6, 1975, from H. M. Pogue, District Forester, B.C. Forest Service, Vancouver, to W. Leesing, Manager, Forestry Division, MacMillan Bloedel Limited.*	Vancouver	Nov. 21/75
154	Pelton Reforestation Ltd.	Vancouver	Nov. 24/75
155	Dr. V. J. Krajina	Vancouver	Nov. 24/75
156	West Coast Environmental Law Association	Vancouver	Nov. 24/75
157	Sierra Club of B.C.—Vancouver Group	Vancouver	Nov. 24/75
158	Federation of British Columbia Naturalists	Vancouver	Nov. 24/75
159	Goodwin Johnson Ltd.	Vancouver	Nov. 25/75
160	Evans Products Company Ltd. & Affiliates	Vancouver	Nov. 25/75
161	Crown Zellerbach Canada Limited	Vancouver	Nov. 25/75
162	Outdoor Recreation Council of British Columbia	Vancouver	Nov. 26/75
163	J. Harry G. Smith	Vancouver	Nov. 26/75
164	Bay Forest Products Ltd.	Vancouver	Nov. 26/75
165	Weyerhaeuser Canada, Ltd.	Vancouver	Nov. 26/75
166	Dominion Securities Corporation Harris & Partners Limited	Vancouver	Nov. 27/75
167	Netherlands Overseas Mills Ltd.	Vancouver	Nov. 27/75
168	Mill and Timber Products Ltd.	Vancouver	Nov. 27/75
169	Sauder Industries Limited	Vancouver	Nov. 27/75
170	Gregory Industries Limited	Vancouver	Nov. 28/75

* Supplementary material other than written submissions presented by participants.

No.	Description	Location	Date
171	Q. C. Timber Ltd.	Vancouver	Nov. 28/75
172	Document entitled "Estimates of 'N.S.R.' Backlog in Public Sustained Yield Units, Explanation of Tables", prepared by B.C. Forest Service.*	Vancouver Vancouver Vancouver	Nov. 28/75 Nov. 28/75 Nov. 28/75
173	Department of Recreation and Conservation—Fish and Wildlife Branch and Parks Branch	Vancouver	Dec. 1/75
174	A. D. Scott and R. A. Shearer		
175	The Mining Association of British Columbia	Vancouver	Dec. 1/75
176	Belkin Packaging Ltd.	Vancouver	Dec. 1/75
177	Forestal International Limited	Vancouver	Dec. 1/75
178	J. S. Nichols, R. P. F.	Vancouver	Dec. 2/75
179	I. H. Schiedel, R. P. F.	Vancouver	Dec. 2/75
180	Canoe Sport British Columbia	Vancouver	Dec. 2/75
181	Rayonier Canada Limited	Vancouver	Dec. 2/75
182	MacMillan Bloedel Limited	Vancouver	Dec. 8/75
183	Environment and Land Use Committee Secretariat	Vancouver	Dec. 9/75
184	Regional District of Mount Waddington	Vancouver	Dec. 9/75
185	Canada Department of Environment—Fisheries and Marine Service, Fisheries Operations Directorate	Vancouver	Dec. 9/75
186	P. Chaworth-Musters	Vancouver	Dec. 10/75
187	Kispiox Valley Community Association	Vancouver	Dec. 10/75
188	N. E. Alexander and Dr. J. H. Borden	Vancouver	Dec. 10/75
189	Nehaliston Lumber Co. Ltd.	Vancouver	Dec. 10/75
190	F. L. C. Reed and Associates Ltd.	Vancouver	Dec. 11/75
191	Pemberton Securities Limited	Vancouver	Dec. 11/75
192	Independent Squamish Logging Operators Limited	Vancouver	Dec. 11/75
193	International Woodworkers of America—Regional Council No. 1	Vancouver	Dec. 12/75
194	Steve Lord	Vancouver	Dec. 12/75
195	Jim and Dorothy Cobb	Vancouver	Dec. 12/75
196	Council of Forest Industries of British Columbia	Vancouver	Dec. 12/75
197	Communist Party of Canada—B.C. Provincial Committee	Vancouver	Dec. 15/75
198	Frolek Sawmills Ltd.	Vancouver	Dec. 15/75
199	Pacific Logging Company Limited	Vancouver	Dec. 15/75
200	SPEC—Smithers	Vancouver	Dec. 15/75
201	Weldwood of Canada Limited	Vancouver	Dec. 16/75
202	Victims of Industry Changing Environment	Vancouver	Dec. 16/75
203	United Fishermen and Allied Workers' Union	Vancouver	Dec. 16/75
204	Canadian Cellulose Company, Limited	Vancouver	Dec. 16/75
204a	Document entitled "The Commercial Timber Banks of British Columbia", Exhibit I to brief of Canadian Cellulose Company, Limited.*	Vancouver	Dec. 16/75
205	Richmond Plywood Corporation Ltd.	Vancouver	Dec. 17/75

* Supplementary material other than written submissions presented by participants.

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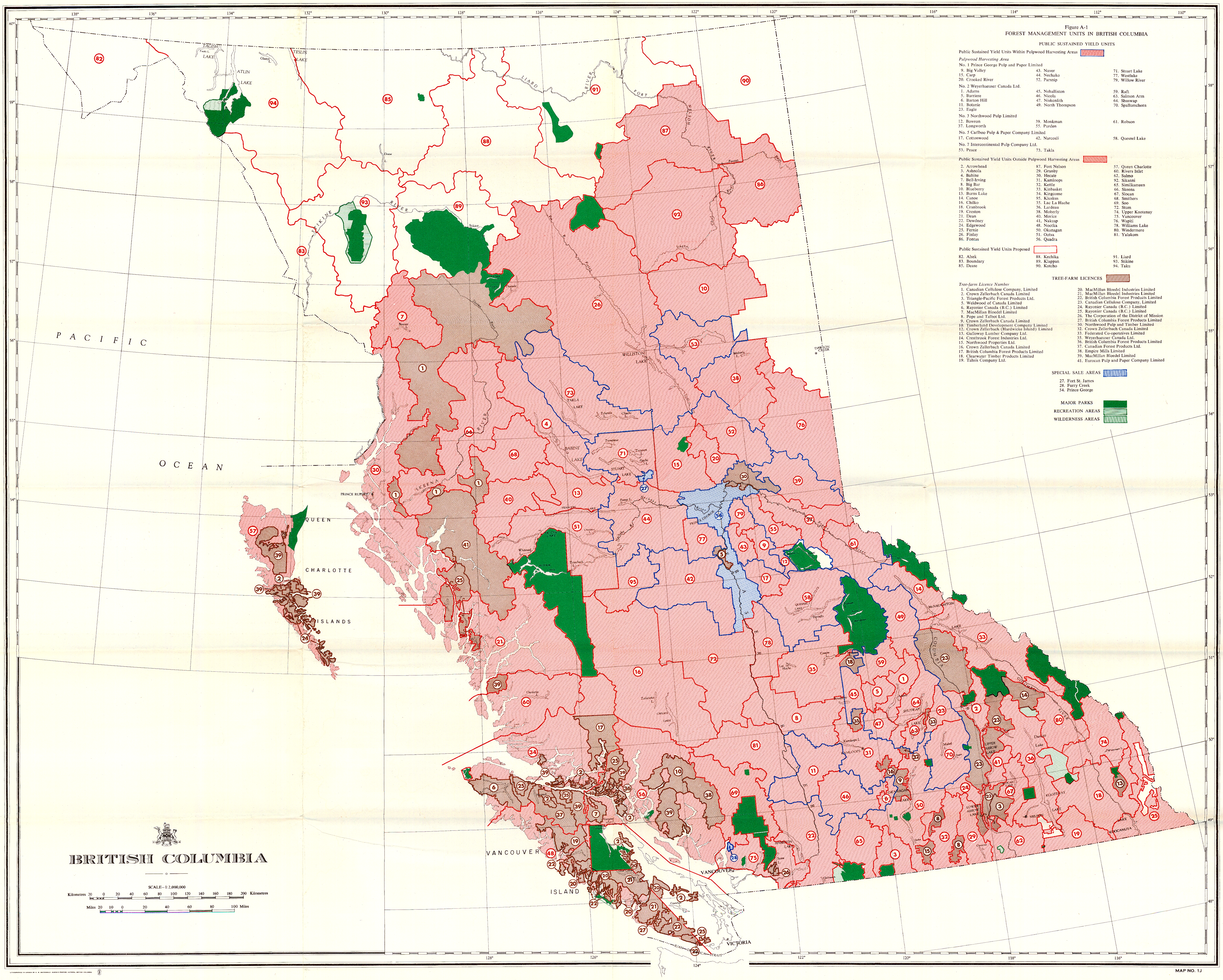

Figure A-1
FOREST MANAGEMENT UNITS IN BRITISH COLUMBIA

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MAP NO. 1J